INSTALLATION ASSESSMENT

OF

ST. LOUIS ARMY AMMUNITION PLANT

REPORT NO. 153

DECEMBER 1979

INSTALLATION ASSESSMENT
OF
ST. LOUIS ARMY AMMUNITION PLANT

REPORT NO. 153

DECEMBER 1979

US ARMY
TOXIC AND HAZARDOUS MATERIALS AGENCY

ABERDEEN PROVING GROUND, MARYLAND 21010

STATEMENT

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

INSTALLATION ASSESSMENT

OF

ST. LOUIS ARMY AMMUNITION PLANT

REPORT NO. 153

CONCUR:

A. D. BAIN
Commander's Representative
St. Louis Army Ammunition Plant

APPROVED:

FRANK A. JONES, JR.
Colonel, CmlC
Commanding
US Army Toxic and Hazardous
Materials Agency

ABSTRACT

A records search was conducted to assess the environmental quality of St. Louis Army Ammunition Plant (SLAAP) with regard to the use, storage, treatment, and disposal of toxic and hazardous materials and to define any condition which may adversely affect health and welfare or result in environmental degradation.

Operations at the plant were exclusively devoted to the production of metal parts for 105mm projectile casings. All casings were shipped to other Army Ammunition Plants for filling and final assembly. The utilities for the plant operation were provided by the City of St. Louis.

The entire 8.5 hectare area encompassed by the plant is covered with buildings, macadam, or concrete pads.

The records search revealed no indications of contamination from past operations at SLAAP.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIXES

I. GENERAL

A. Purpose of the Assessment

To assess the environmental quality of St. Louis Army Ammunition Plant (SLAAP) with regard to the use, storage, treatment, and disposal of toxic and hazardous materials and to define any conditions which may adversely affect health and welfare or result in environmental degradation.

B. Authority

DARCOM Regulation 10-30, Mission and Major Functions of the US Army Toxic and Hazardous Materials Agency (USATHAMA), 22 May 197).

C. Introduction

1. In response to a letter from the Project Manager for Chemical Demilitarization and Installation Restoration (PM CDIR), now USATHAMA, requesting the identification of potentially contaminated installations, the Commander, US Army Armament Materiel Readiness Command (ARRCOM), recommended SLAAP be included in the Installation Restoration Program.

2. Presurvey instructions were forwarded to SLAAP by letter on 20 December 1978 to outline assessment scope, provide guidelines to SLAAP personnel, and obtain information for review by the Records Search Team prior to the onsite search.

3. Personnel were briefed by USATHAMA on the Installation Restoration Program prior to the onsite records search.

4. Various government agencies were contacted during the period of 8 January 1979 through 23 March 1979 for documents pertinent to the records search effort. Agencies contacted included:

a. Department of Defense Explosives Safety Board (DDESB).
b. US Army Environmental Hygiene Agency (USAEHA).
c. US Geological Survey (USGS).
d. US Army Engineer Waterways Experiment Station (WES).
e. National Technical Information Service (NTIS).
f. US Army Armament Materiel Readiness Command (ARRCOM).
g. Chemical Systems Laboratory (CSL).

5. The onsite phase of the records search was conducted from 5 March through 9 March 1979. The following personnel were assigned to the team and prepared the report:

a. Mr. Norman Leibel, Team Leader, CSL.
b. Mr. Jerry Cichowicz, General Engineer, CSL.
c. Mr. Reuben Proper, Chemist, CSL.
d. SP4 Janice Canterbury, Environmentalist, CSL.
e. Mr. Harry Woods, Geologist, WES.

6. In addition to the review of records, interviews were conducted with several employees. A ground tour of the installation was also conducted and photographs taken during this tour are included as Appendix A.

7. The findings, conclusions, and recommendations are based on the records made available at the time of the search. Where conspicuous discrepancies existed, attempts were made to determine the validity of information by contacting other sources.

D. Brief History

The 8.5 hectares (ha) now comprising SLAAP were originally included in the 111.7 ha area of the St. Louis Ordnance Plant. The Ordnance Plant was the largest small arms ammunition installation in the world and embodied three operating divisions: shell, core, and ammunition.

The existing plant area, a small portion of the Ordnance Plant, was constructed in 1941 for the production of small arms ammunition. With the addition of the Nick and Break Area and the Forge Building in 1944, the present plant was converted from small arms to 105mm projectile production.

After producing 2,500,000 projectiles for the World War II requirement, the plant was placed in "Standby-Under Power Extended Storage Condition" by the Chevrolet Motor Division, General Motors Corporation in September 1945. The St. Louis Ordnance District maintained the plant on a standby basis with civil service personnel until its reactivation on 25 March 1951 by the Chevrolet Motor Division. The contract for production was transferred from the St. Louis Ordnance District to the St. Louis Ordnance Plant in March 1952. Production from 1951 to 1954 totalled 19,094,325 projectiles. Plant operations were terminated as of 1 May 1954. Interim maintenance was performed until 30 August 1954 when a layaway contract was approved. On 31 December 1958, the maintenance contract with General Motors was terminated and maintenance was assumed by the United States Defense Corporation (Olin) and continued until 1966. In September 1966, Chevrolet Motor Division started reactivation and took over the complete operation. The first production was accepted in November 1966. When operations were terminated in December 1969, 23,878,646 projectiles had been produced. Layaway operations were started immediately and were completed by April 1970. General Motors continued maintenance of the plant until February 1972.

On 1 March 1972, Donovan Construction Company of Minneapolis, Minnesota, was awarded a contract for the maintenance and surveillance of SLAAP. In addition to the maintenance and surveillance contract, a companion facilities contract was executed on the same date. These contracts have been renewed annually since that time. The facilities contract was used as an instrument to procure 94 major pieces of production equipment. The equipment is stored at SLAAP pending a decision by the Department of the Army as to whether this plant should be modernized or if a new facility should be built elsewhere.

Donovan Construction Company subcontracted the maintenance and surveillance of this installation to Plant Facilities and Engineering, Incorporated, from inception; the subcontractor continues to provide this service at the present time.

E. Leases

1. There are no active leases at SLAAP.

2. SLAAP leases 11,858 square meters of property from the State of Missouri to be used as a parking lot in the event of mobilization.

3. There have never been any active grazing or agricultural leases at SLAAP.

F. Legal Actions

There are presently no legal actions pending against SLAAP and neither available records nor personnel interviewed revealed that there had ever been any legal suits resulting from production contamination.

II. ENVIRONMENTAL SETTING

A. Meteorological Data

SLAAP is located just within the city limits of northern St. Louis, Missouri. The climate of St. Louis has been defined as "humid continental" and is characterized by four distinct seasons. Summers are warm and extended periods of extremely hot temperatures are rare; temperatures of >32°C occur 35 to 40 days a year, usually during July and August. Spring and autumn are generally moderate. Winters are brisk without extended periods of bitter cold; temperatures of ≤0°C occur less than 25 days per year; readings below -17°C occur rarely. The average mean temperature is 14°C. The annual average precipitation is 93 centimeters (cm) and is well distributed throughout the year. Occasionally there are high winds and flooding in the St. Louis area. Due to its relative distance from the Mississippi River, flooding should not present any problem at SLAAP.

B. Geological Setting

1. Physiography/Topography/Drainage

SLAAP lies within the corporate limits of the City of St. Louis, St. Louis County, Missouri, as shown in Figure 1. St. Louis County is situated in the southern portion of the Dissected Till Plains Section of the Central Lowland Province as shown in Figure 2. The topography of the eastern two-thirds of St. Louis County consists of rolling uplands with slopes between 2 to 5% at elevations up to 168 meters (m) mean sea level. Local relief seldom exceeds 30 m. The drainage within St. Louis County terminates in the Missouri River on the north, the Mississippi River to the east, and the Meramec River to the south.

2. Geology

a. Surface

St. Louis County lies at the southern extremity of the glacier activity with only a few patches of soil having been tentatively classified as glacial material. Almost all of the surface formation in St. Louis County consist of extensive deposits of windblown silt (loess) derived from the flood plain of the Missouri River during the Pleistocene (glacial) Age. The deepest loess, more than 15 m thick, is found along the bluffs of the Missouri River. In general, these deposits narrow to the south and are seldom more than 1.5 to ? m deep along the ridgetops in the southwestern part of the county. Loess deposits on the adjacent hillsides have generally been removed or reworked by surface water.

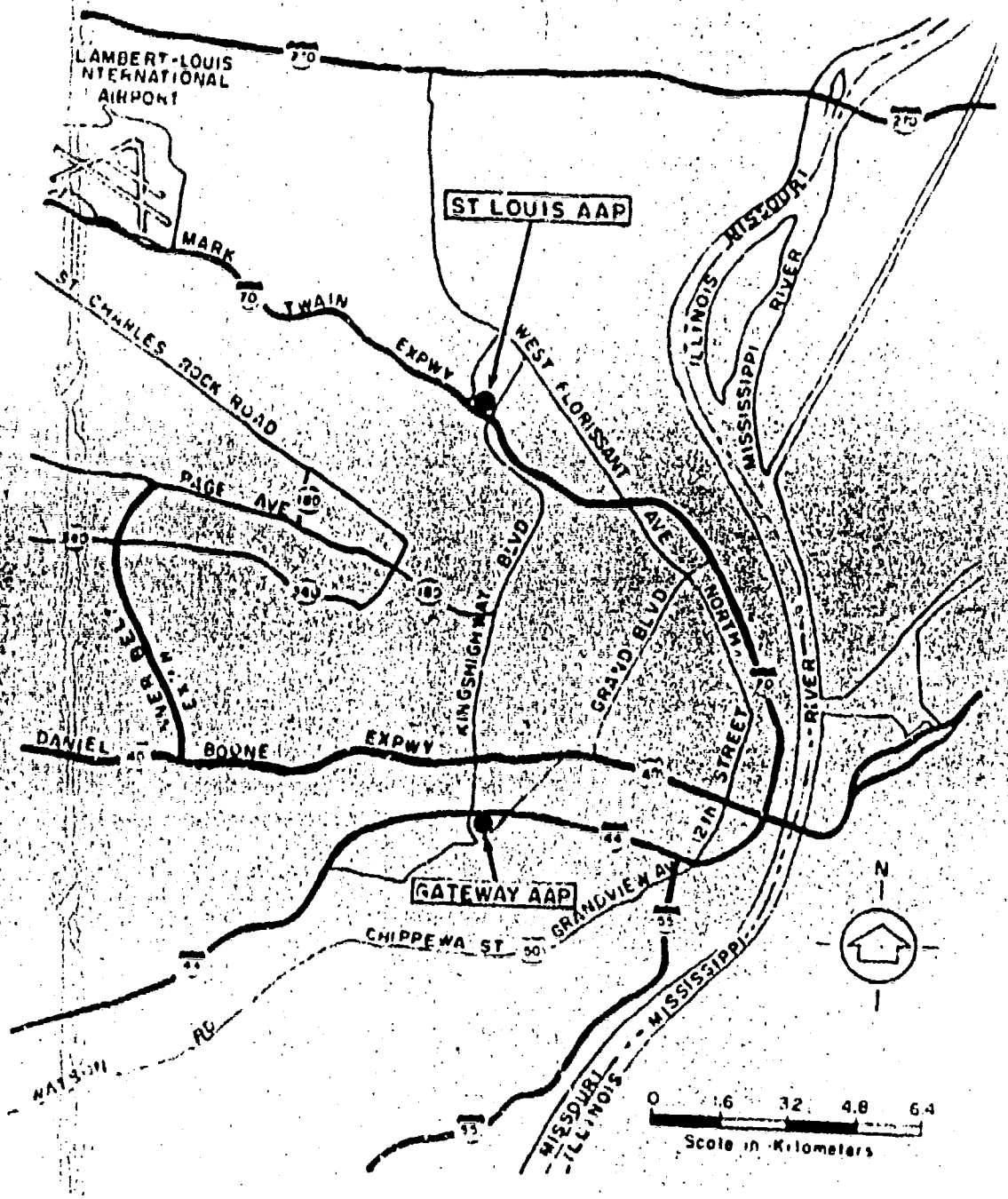


Figure 1. Location Map, St. Louis Army Ammunition Plant

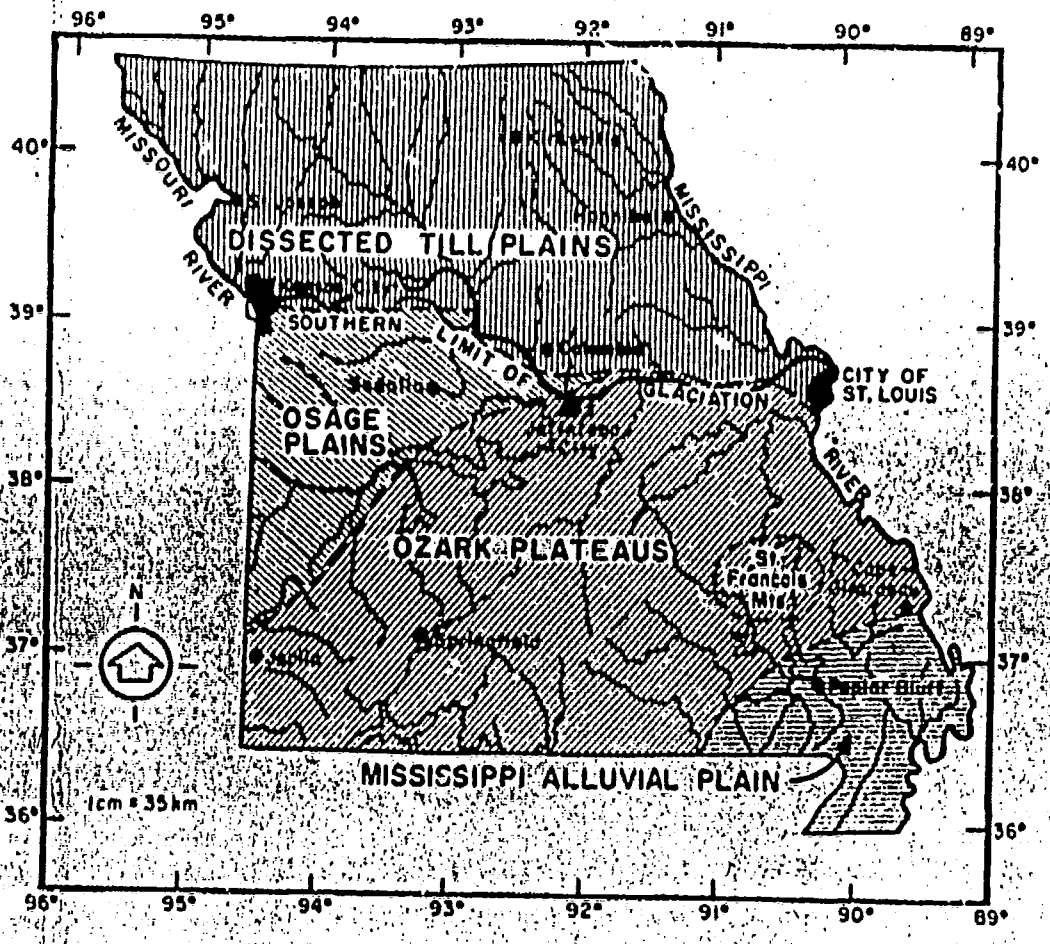


Figure 2. Physiographic Provinces of Missouri

b. Subsurface

The bedrock geology in St. Louis County consists of essentially flat-lying sedimentary formations, mostly limestone and dolomite. A slight regional northeast dip has been modified by several minor northwest-southeast trending folds or flexures. A soil test boring drilled in 1971 at SLAAP encountered medium hard, light gray, medium- to fine-grain limestone at 19.8 m; this is apparently the Ste. Genevieve limestone of the Mississippi Age and is overlain by 13 m of medium hard, light yellow to gray, sandy clay shale to shale which is possibly of the lower Pennsylvania Age. The above formations are listed in Table I which also includes a generalized stratigraphic column for St. Louis, St. Charles, and Jefferson Counties, Missouri. The soil test boring log is presented in Appendix B.

All bedrock units in and around St. Louis are capable of yielding varying amounts of water to wells. Yields of wells are dependent, of course, on such factors as depth, length, and diameter of the open hole; formations penetrated; geographic location; structural attitude of the rock; and permeability of the aquifers tapped. Most wells in the St. Louis area yield a maximum of 189 liters per minute (l/min) from depths down to 244 m. Water yields of up to 7,520 l/min can be expected from wells drilled in thick alluvial deposits and contain little silt or clay-sized material.

Some water-bearing characteristics of the subsurface units in the St. Louis area are presented in Table I; the more important zones are identified by an asterisk.

3. Soil

SLAAP is almost entirely covered with buildings and/or parking lots. The remaining areas have been reworked during construction, whereby the original surface soil has lost its true identity.

The subsurface soil extends down to a depth of approximately 8 m as determined from the soil test boring at SLAAP. This material is a medium stiff, light gray to brown silt to clayey silt. Rust stains and small roots were encountered at 6 m. Weathered shaley limestone underlies the subsurface soil.

C. Biota

SLAAP is located within the industrial/residential area of St. Louis. The plant area is largely covered by buildings, roads, parking lots, and other man-made structures; furthermore, SLAAP encompasses no bodies of water. Thus, very limited plant and animal life exists in or near the vicinity of the plant.

The birds, fish, mammals, and plants found in the St. Louis area are included in Appendix C.

TABLE 1

GENERALIZED STRATIGRAPHIC COLUMN FOR ST. LOUIS, ST. CHARLES, AND JEFFERSON COUNTIES, MISSOURI

System	Series	Group	Formation	Aquifer Group	Thickness (Meters)	Dominant Lithology	Water-bearing Character
Quaternary	Holocene		Alluvium[1]		0-46	Sand, gravel, and clay.	Some wells yield more than 7,573 l/min.
	Pleistocene		Loess		0-30	Silt	Essentially not water yielding
			Glacial till		0-17	Pebbly clay and silt.	
Pennsylvanian	Missourian	Pleasanton	Undifferentiated		0-23	Shales, siltstones, "dirty" sandstones, coal beds and thin limestone beds.	Generally yields very small quantities of water to wells. Yields range from 0 to 38 l/min.
	Desmoinesian	Marmaton	Undifferentiated		0-37		
		Cherokee	Undifferentiated		0-61		
	Atokan		Undifferentiated				
Mississippian	Meramecian		Ste. Genevieve Formation		0-49	Argillaceous to arenaceous limestone.	
			St. Louis Limestone		0-35		
			Salem Formation		0-34		
			Warsaw Formation		0-34		
	Osagean		Burlington-Keokuk Limestone		0-75	Cherty limestone	
			Fern Glen Formation		0-37	Red limestone and shale	Yields small to moderate quantities of water to wells. Yields range from 19 to 190 l/min. Higher yields are reported for this interval locally.
	Kinderhookian	Chouteau	Undifferentiated		0-37	Limestone, dolomitic limestone, shale, and siltstone.	
Devonian	Upper	Sulphur Springs	Bushberg Sandstone		0-18	Limestone and sandstone	
			Glen Park Limestone				
			Grassy Creek Shale		0-15	Fissile, carbonaceous shale.	
Silurian			Undifferentiated		0-61	Cherty limestone.	
Ordovician	Cincinnatian		Maquoketa Shale		0-40	Silty, calcareous, or dolomitic shale.	Probably constitutes a confining influence on water movement.
			Cape Limestone		0-2	Argillaceous limestone.	
	Champlainian		Kimmswick Formation		0-48	Massive limestone.	Yields small to moderate quantities of water to wells. Yields range from 11 to 8? l/min. Decorah Formation probably acts as a confining bed locally.
			Decorah Formation		0-15	Shale with interbedded limestone.	
			Plattin Formation		0-73	Finely crystalline limestone.	
			Rock Levee Formation		0-78	Dolomite and limestone, some shale.	
			Joachim Dolomite		0-41	Primarily argillaceous dolomite.	
			St. Peter Sandstone	3	0-49	Silty sandstone, cherty limestone grading upward into quartzose sandstone	Yields moderate quantities of water to wells. Yields range from 38 to 53? l/min.
			Everton Formation		0-40		
	Canadian		Powell Dolomite	4	0-76	Sandy and cherty dolomites and sandstone.	Yields small to large quantities of water to wells. Yields range from 15 to 1,136 l/min. Upper part of aquifer group yields only small amounts of water to wells.
			Cotter Dolomite		0-96		
			Jefferson City Dolomite		0-69		
			Roubidoux Formation		0-58		
			Gasconade Dolomite		0-85		
			Gunter Sandstone Member				
Cambrian	Upper		Eminence Dolomite	5	0-57	Cherty dolomite, siltstones, sandstone and shale	Yields moderate to large quantities of water to wells. Yields range from 38 to 3,218 l/min.
			Potosi Dolomite		0-93		
		Elvins	Derby-Doerun Dolomite		0-53		
			Davis Formation		0-46		
			Bonneterre Formation		75-117		
			Lamotte Sandstone		73+		
Precambrian						Igneous and metamorphic rock	Does not yield water to wells in this area

[1] [illegible] may be of Pleistocene Age

NOTE: Stratigraphic nomenclature may not necessarily be that of the U.S. Geological Survey

* Water [illegible]

III. DISCUSSION

A. Potential Contamination

1. Installation Operations

a. Industrial Operations

Building numbers are keyed to the General Site Map, Figure 3.

The primary mission of SLAAP was the production of 105mm projectile casings.* The projectiles were shipped to other Army ammunition plants for explosive filling and final assembly. Over 41,000,000 projectiles were produced from 1944 through 1970.[3] During the last production runs at SLAAP, the production rate reached 600,000 per month. In the event of mobilization, production capability is planned at 800,000 per month.

A support function of SLAAP involved the production of acetylene gas from calcium carbide. The gas was produced and stored in Building 9 which is located in the southwest corner of the plant.[4] The acetylene was used to score (nick) the steel billets prior to the break operation.

Projectile manufacturing operations began in Building 1. Long steel billets were cut into prescribed lengths using a nick and break method; hydraulic systems were employed during the break operation. Spray and quench operations were also performed in this building for cooling. All solid wastes and some liquid wastes were removed from SLAAP by a local contractor. Wash down type liquid wastes were pumped directly into the sewage system.[4] The plant discharge was monitored periodically by the St. Louis sewer authority and discharges were in compliance with city ordinances.[4,5]

Building 2 was the Forge Building which contained ten rotary gas and oil fired furnaces for slug heating/forging. Spray and quench operations were performed in this building for cooling. Various hydraulic systems were used.

Two floors in Building 3 were utilized for machining operations. The building contained various lathe operations, hydraulic presses, conveyors, air driven machinery for cutting, shaping, and finishing of metal, quenching and metal treating processes, rust proofing processes, painting, and stripping and metal preservative operations.[3,4] Welding equipment, machine shops, electrical and carpenter shops, and a small automotive shop are also housed in this building.[6]

*Hereafter, all reference to projectile casings will be referred to only as projectiles.

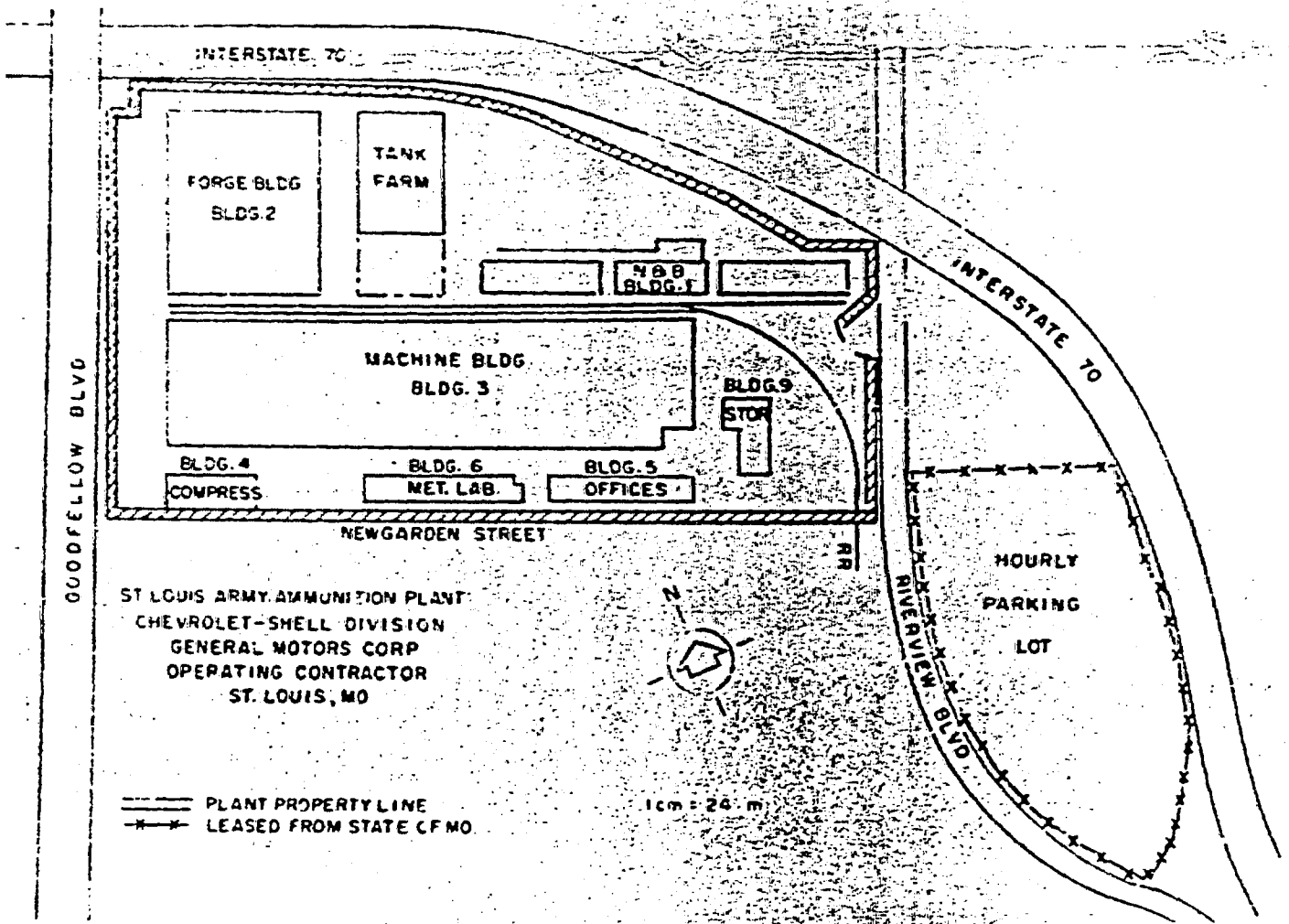


Figure 3. General Site Map of St. Louis Army Ammunition Plant

A self-contained liquid storage area is located on the first floor of this building. It was used to store drums of processing chemicals, oil, and greases as shown in Tables II and III. An area to the front of Building 3 houses the administrative offices.

Building 4 is the Compressor Building.

Building 5 was used for contractor office space. It was also leased during 1962 and 1967 to the Futura Manufacturing Company for the assembly of small radios.

The metallurgy laboratory was located in Building 6. This building was also leased to the Futura Manufacturing Company during the 1960's.

Building 9 was used for the production of acetylene gas.

A tank farm is located between Buildings 1 and 2 and contains nine oil tanks to fuel the furnaces in the Forge Building (2). Each tank has a capacity of 19,000 liters.

b. Lessee Industrial Operations

Futura Manufacturing Company leased Buildings 5 and 6 (excluding the laboratory area on the first floor) during the period from 1 January 1962 to 1 January 1967 for the assembly of small pocket-sized radios. These types of operations did not result in the contamination of the plant area.

Industrial discharge produced by lessee operations was directed to the common (storm and sanitary) sewage systems. Solid waste was hauled away from SLAAP by subcontractors.

c. Laboratory Operations

A metallurgical laboratory was located on the first floor of Building 6 during all the production years. The laboratory performed quality control and the operations performed included: polishing, measuring, some etching, and utilizing small amounts of chemicals and/or solvents. Liquid waste was flushed into the common storm and sanitary sewage system.

d. Proof and Surveillance Testing

Since the casings produced at SLAAP were not finished products, proof and surveillance testing was never conducted at the plant. Metallurgical inspection was the only type of quality assurance performed on the 105mm projectiles.

TABLE II

ST. LOUIS ARMY AMMUNITION PLANT

OIL AND GREASE USAGE LIST (January 16, 1969)

Type

- MR 186 - Hot Forging Compound
- Molyshield Grease - Alubo
- MX-2 Hi-Temp Grease
- Coolex #26 Coolant
- GM-3 Cold Heading Compound
- Spindle Oil
- Shell Carnea 31 Machine Oil
  Grease-Spec. 145 GM
- Mobiltex EP #1 Grease
- Texaco Soluble "D" Oil
- Gimperial 20
- Fibrax Grease #370
- Shell Rotella #20
- Shell Rotella #30
- Automatic Transmission Fluid
- Roller Rythem
- N53 Rust
- Shell Alvania Grease
- Hydraulic Oil GM Spec. 16A
- Shell Macoma 6-0
- Mobil DTE 105 Oil
- Mobil Extra Heavy Oil
- Regal GRO Spindle Oil
- Econogrind

TABLE III

ST. LOUIS ARMY AMMUNITION PLANT: PROCESS FLUID USAGE*

Fluid	Volume (liters)
Thinner (Toluol)	45,000
Enamel 1T-E-516	159,000
Primer MIL-P-22332A	36,000
Corrosion Preventive Compound (Phosphoric Acid)	2,500

*For rate of 600,000 projectiles/month during 7.1 - 105mm projectile Production Run (1969)

e. Training Areas

Although there are no troop training areas at SLAAP, in-service training programs have been conducted which were job and safety related.

f. Chemical/Biological/Radiological Activities

There have never been any chemical/biological agents or radioactive materials manufactured, stored, or tested at SLAAP.

g. Storage of Toxic/Hazardous Materials

The only toxic or hazardous items used and stored at SLAAP were: thinners, (toluol); enamels, primers, corrosion preventive compounds, (phosphoric acid), forging compounds, machinery coolants, transmission fluids, hydraulic oils, and various types of machinery oil and greases. Table II is a complete listing of greases and oils presently used and stored at SLAAP. Table III has a list of chemicals and paints used in the plant operations. These petroleum products and industrial chemicals were stored in a secured area within the [illegible].

h. Pesticide/Herbicide/Fertilizer Usage

The pest control program has been contracted to a commercial agency in the St. Louis area.

Pesticide usage has included Rid-a-Bird with the active ingredient, renthion, and Avitrol which contains 4-aminopyridine. Avitrol is also used in pro in form as a bait. Both chemicals are EPA approved and are not considered to be persistent.

Malathion is occasionally used for termite control. The herbicide 2,4,5-T Ester is used at SLAAP to control brush and weeds. There are no records to indicate the past storage of pesticides, herbicides, or insecticides at SLAAP.

2. Disposal Operations

a. Sewage Treatment

All industrial and sanitary waste generated at SLAAP is discharged into the St. Louis municipal sewer system. The waste discharge

*The use of trade names in this report does not constitute an official endorsement or approval of such commercial products. This report may not be cited for purposes of advertisement.

was monitored periodically by the St. Louis sewer authority and discharges were in compliance with city ordinances. The city sewage is treated at the St. Louis treatment facility.

b. Burials

There are no burial sites located at SLAAP. All trash and wastes are collected and hauled away by a local contractor.

c. Holding and Settling Ponds

There have never been any holding and/or settling ponds or waste lagoons; however, collection sumps were present in the manufacturing areas. The sumps were cleaned out periodically and the sludge was hauled from the plant by a local contractor. Table IV is a typical listing of production waste which was removed from SLAAP. This is based on a production rate of 600,000 projectiles (105mm) per month.

d. Demolition and Burning Ground Areas

There have never been any demolition or burning ground areas on this installation.

e. Demilitarization

Demilitarization is not applicable to SLAAP activities.

f. Miscellaneous

No records indicated large spills of industrial chemicals or petroleum products. There was evidence, however, of minor spills at the fuel oil tank farm which resulted from leaking pipe joints and opening and closing of system valves. Although collection areas have been provided under the tanks in the event of serious leaks, these areas are not lined. The small quantity of oil from leaky pipe joints is not considered a significant contamination problem.

B. Water Quality

SLAAP has always purchased its water from the St. Louis, Missouri, water system. The water source is used for all plant operations.

C. Migration Potential

The substratum soil of SLAAP consists of 4.5 to 7.6 m of silt and a clayey silt. No permeability values are available on these soils; however, it can be assumed that vertical migration of liquids would be rather slow.

TABLE IV

ST. LOUIS ARMY AMMUNITION PLANT: WASTE DISPOSAL*

CLASSIFICATION	METRIC TONS PER YEAR	METHOD OF DISPOSAL ONSITE	OFFSITE LANDFILL	HAULED BY:
1. Garbage	816	-------	100%	A-1 Hauling
2. Cardboard	544	-------	100%	A-1 Hauling
3. Paper, Cloth, Grass, Etc.	544	-------	100%	A-1 Hauling
4. Wood	181	-------	100%	A-1 Hauling
5. Rubber	N/A	-------	-------	----------
6. Plastics	N/A	-------	-------	----------
7. Oils	3,537	-------	100%	A-1 Hauling
8. Flammable Liquids	1	-------	100%	A-1 Hauling
9. Residues & Tars	181	-------	100%	A-1 Hauling
10. Wastewater Treat Sludges	N/A	-------	-------	----------
(a) Oily	N/A	-------	-------	----------
(b) Lime Bearing	N/A	-------	-------	----------
(c) Metallic Hydroxide	N/A	-------	-------	----------
11. Inert Solids	64	-------	100%	A-1 Hauling
12. Cans, Bands, Wire, Etc.	9	-------	100%	A-1 Hauling
13. Special Wastes	N/A	-------	-------	----------

*For rate of 600,000 projectiles/month during the final 105mm projectile production run (1969).

The underlying limestone is susceptible to the formation of a karst (solution channels and cavities) once surface water reaches the limestone. Since most of the surface area of SLAAP is covered and all surface runoff and industrial liquids were controlled, the available contamination for offpost migration was held to a minimum.

SLAAP has been inactive for several years in terms of production and all sumps and industrial drains have been cleaned and flushed.

IV. FINDINGS

A. There are no current industrial operations at SLAAP; the last projectile production operation was conducted in 1969.

B. According to available records there has never been:

1. Any burning sites, sanitary landfills, burial sites, or holding ponds at SLAAP.

2. Any proof and surveillance testing conducted at SLAAP.

3. Any troop training areas.

4. Any chemical or biological agents or radiological materials manufactured, stored, or tested at SLAAP.

C. During World War II and the Korean and Vietnam Conflicts, only industrial chemicals and lubricants were used or stored at SLAAP.

D. Based on available records, SLAAP water supply and sewage treatment have always been provided by the St. Louis Metropolitan Area.

E. Surface drainage and sanitary wastes have been and are presently directed into a common sewer system.

F. During plant operation, contaminated liquid and solid industrial wastes were collected in sumps and holding tanks and removed from the plant area by a private contractor.

G. There are no legal actions pending against SLAAP. Available records did not indicate any legal actions from past plant operations.

V. CONCLUSIONS

A. SLAAP is not contaminated with residual waste from past operations.

B. There is no evidence of past or present contaminant migration.

REFERENCES

1. DARCOM Installations and Activity Brochure, Report Control Symbol DRCIS-102-R1, dated 31 March 1977.

2. Krusekopf, H. H. and Pratapas, D. B., "Soil Survey of St. Louis County, Missouri," U.S. Department of Agriculture, Washington, D.C., 1923.

3. Lutzen, E. E. and Rockway, J. D., Jr., "Engineering Geology of St. Louis County, Missouri," Missouri Geological Survey and Water Resources, EG Report No. 4, Rolla, Missouri, 1971.

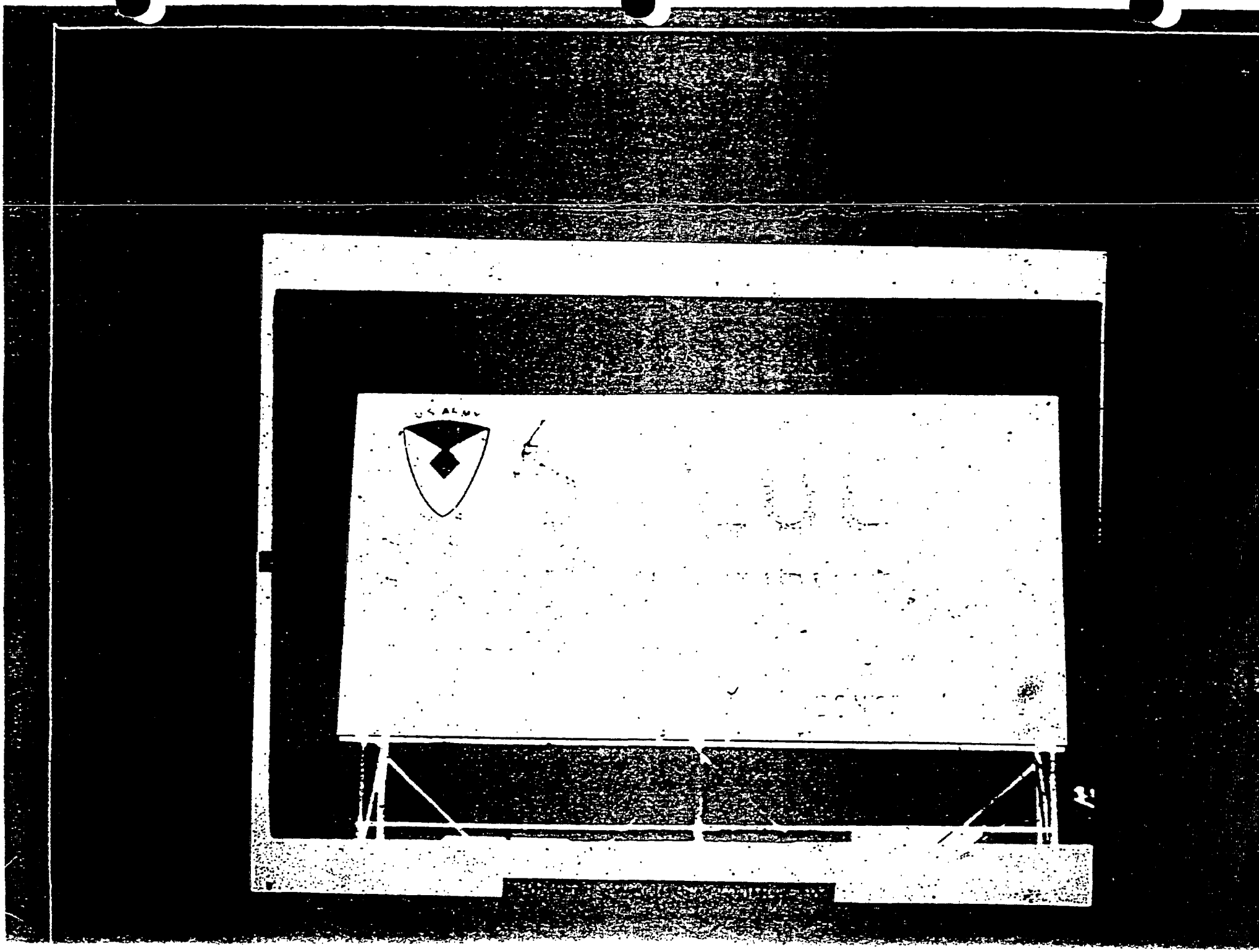
4. Miller, D. E., et al., "Water Resources, St. Louis Area, Missouri," Missouri Geological Survey and Water Resources, WR Report No. 30, Rolla, Missouri, 1974.

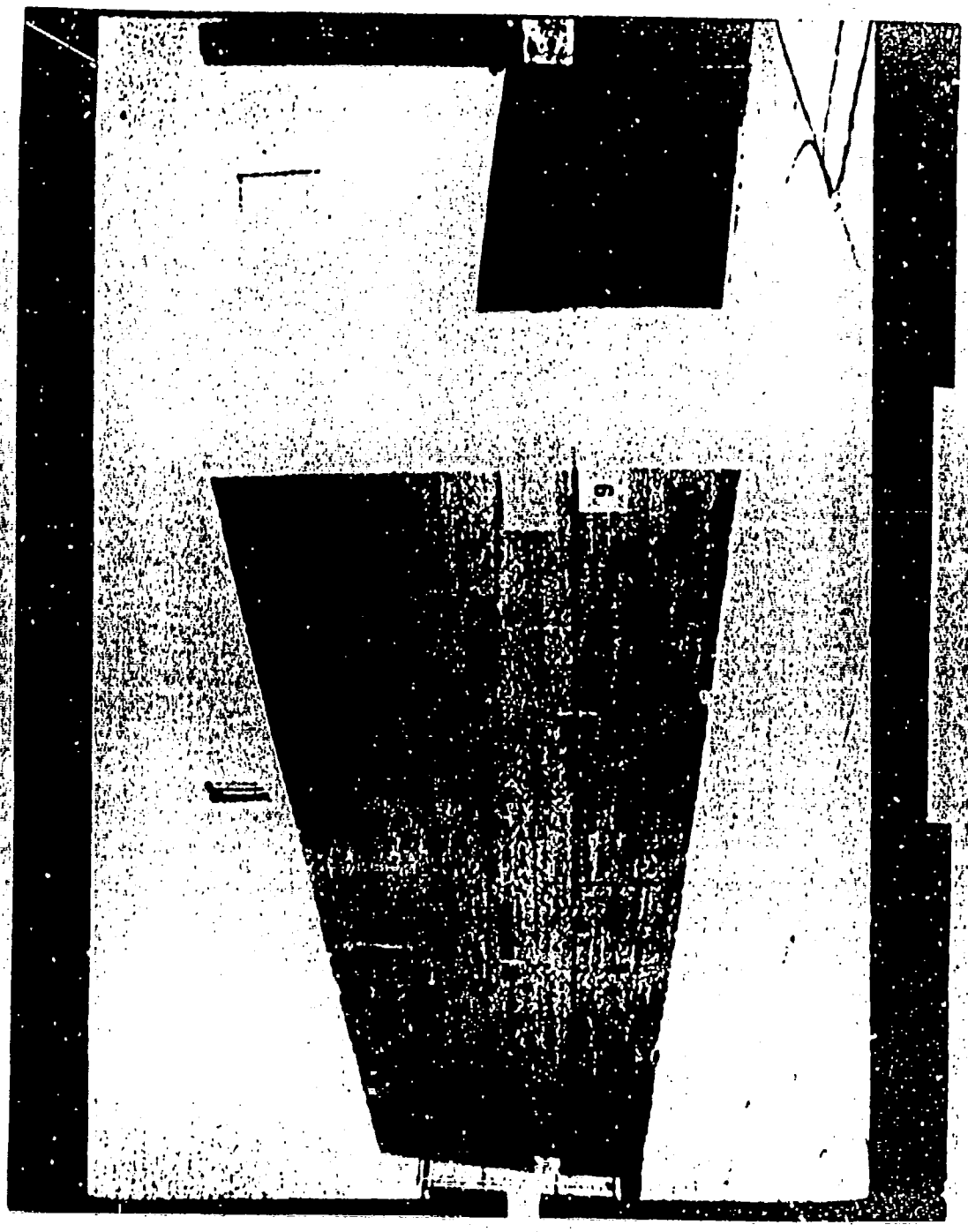
APPENDIX A

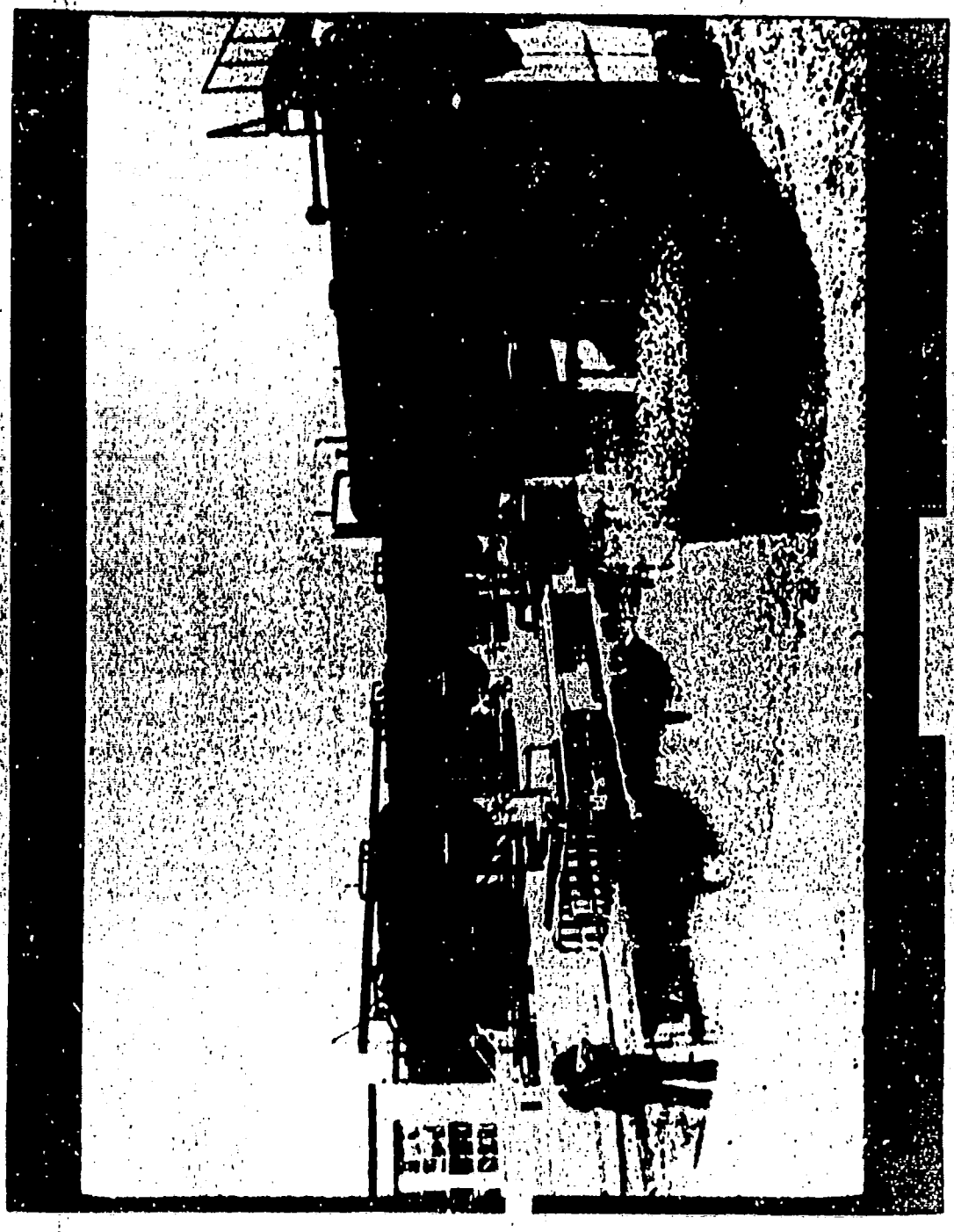
PHOTOGRAPHS

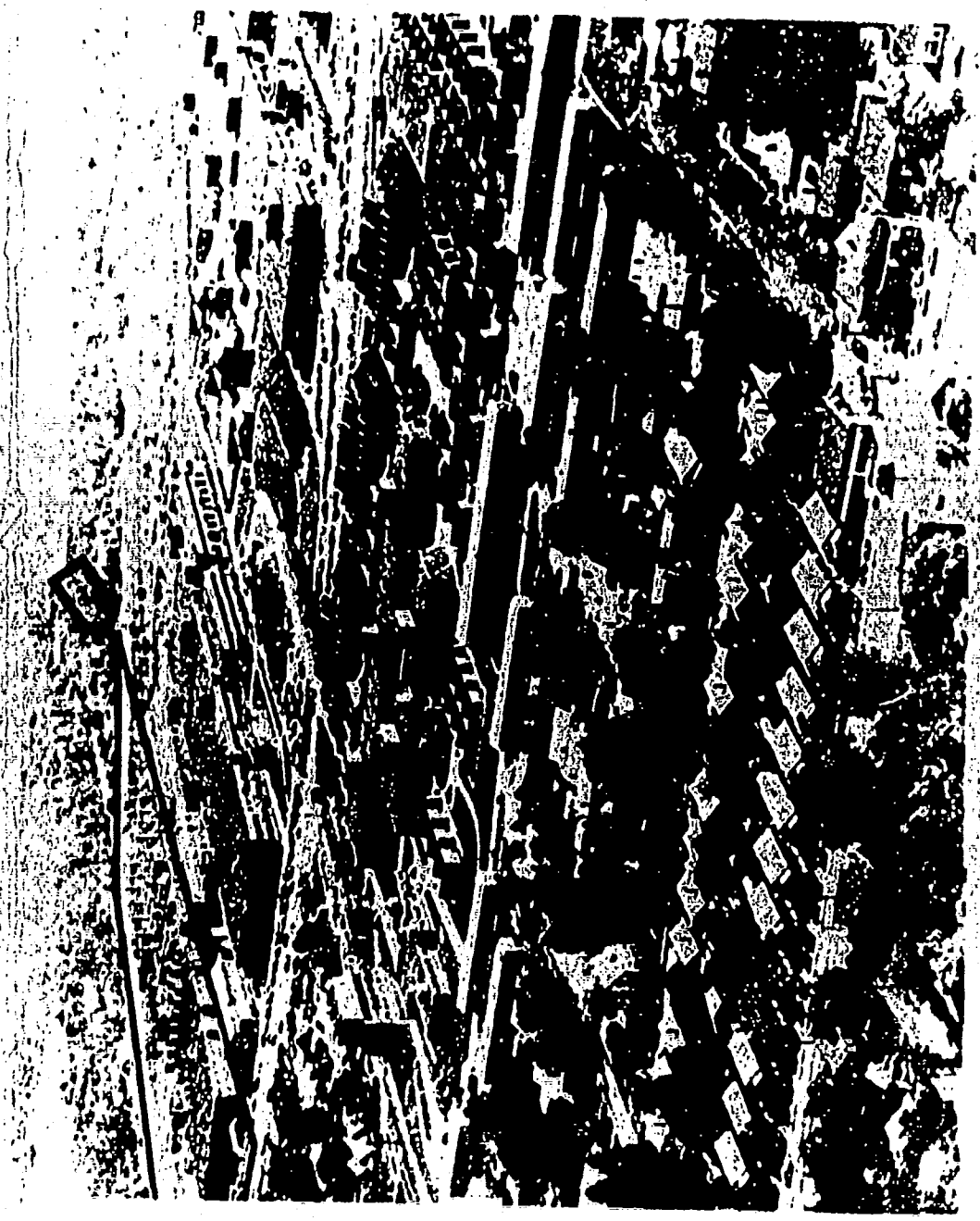
OF

ST. LOUIS ARMY AMMUNITION PLANT









APPENDIX B

SOIL TEST BORING - ST. LOUIS ARMY AMMUNITION PLANT

SOIL TEST BORING - ST. LOUIS ARMY AMMUNITION PLANT

Depth Below Ground Surface (Meters)	Blows in Casing	Sample Number	Blows in Sampler	Penetration of Sampler (cm)	FIELD IDENTIFICATION OF SOIL (Include relative firmness, relative moisture, color, mention all soil constituents, etc.)	REMARKS
1.5					Reinforced concrete floor	Set 3 m of 15.2 cm casing advanced boring w/10.2 cm roller cone bit.
1.6		1	15-15	15.2-15.2	Moist, medium stiff brown clay silt fill.	
3.1					Moist, compact limestone rock and gravel fill with gray clayey silt binding.	
3.9						
3.0					Damp, medium stiff light gray clayey silt fill.	
		2	3 6	15.2-15.2		
4.6					Damp, stiff to medium stiff brown clay, clayey silt and silt fill in layers. Trace of gray silt.	
		3	7-8	15.2-15.2		
5.3						
6.1					Moist, medium stiff light gray silt, traces of clay, rust stains, and small roots.	
		4	3-3	15.2-15.2		
7.6						
9.1		5	3 6	15.2-15.2	Damp, stiff light brown and gray clay; some gravel.	
9.1					Damp, hard light gray, slightly sandy shaley clay with thin layers of brown and yellow shaley clay.	
9.140		6	21-45	15.2-15.2		

SOIL TEST BORING - ST. LOUIS ARMY AMMUNITION PLANT (Continued)

Depth below Ground Surface (Meters)	Blows on Casing	Sample Number	Blows On Sampler	Penetration Of Sampler (cm)	FIELD IDENTIFICATION OF SOIL (Include relative firmness, relative moisture, color; mention all soil constituents, etc.)	REMARKS
13.7						
14.3		7	37-50	15.2-7.6	Dry, medium hard, light gray, brown and yellow slightly sandy shale.	
9.1						
		8	40-50	15.2-8.9	Dry, medium hard, light gray to gray shale. A trace of clay.	
13.7						
		9	50-50	15.2-12.7		
15.2					Dry, medium hard, light gray to gray shale. A trace of clay.	
		10	37-50	15.2-11.4		
16.5						
16.8						
		11	50	10.2	Dry, very hard, brown, yellow and gray mottled shaley clay.	
15.3						
		12	50	11.4		

SOIL TEST BORING -- ST. LOUIS ARMY AMMUNITION PLANT (Continued)

Depth Below Ground Surface (Meters)	Blows On Casing	Sample Number	Blows On Sampler	Penetration Of Sampler (cm)	FIELD IDENTIFICATION OF SOIL (Include relative firmness, relative moisture, color, mention all soil constituents, etc.)	REMARKS
20.0						
		T3	50	5.08	Began NX coring. Cored 20 m to 21.5 m. Recovered 1.45 m of medium hard, light gray, medium to fine grain limestone with bedding plane 3.8 cm to 7.62 cm apart. 2.54 cm clay and weathered rock seam at 20.1 m. Pulled over 2.8 cm core in bottom of boring. Ground up 1.3 cm at 20.1 m due to softness of rock and coring action.	
21.5					Total depth of drilling at 21.5 m.	

APPENDIX C

FLORA AND FAUNA
ST. LOUIS ARMY AMMUNITION PLANT

MISSOURI FLORA

Bergemot
Bittersweet Family
Bloodroot
Buttercup
Calamint
Cinquefoil
Columbine
Crateagus
Delphinium
Eugenia
Fire pink
Fleabane
Geranium
Goldenrod
Joe-pye weed
Lily Family
Mallow Family
Milkweed
Missouri gooseberry
Missouri primrose
Mullein
Nasturtium
Nettle
Orchid Family
Phlox
Pineweed
Plantain
Pokeweed
Queen Anne's Lace
Rhododendron
Rose Family
Sassafras
Scorpion grass
Selfheal
Solomon's seal
Spring beauty
Sorrel
St.-John's-wort
Teasel Family
Trillium
Verbena
Violet Family
Wild crocus

RARE AND ENDANGERED PLANTS OF ST. LOUIS COUNTY

Asclepias meadii
Aster commutatus
Boltonia asteroides var. decurrens
Botrychium dissectum var. dissectum
Carex douglasii
Carex gracillima
Carex praegracilis
Carex schweinitzii
Distichlis stricta
Fontinalis disticha
Habenoria leucophaea
Lithospermum latifolium
Lycopodium lucidulum var. lucidulum
Malaxis unifolia f. unifolia
Matelea obliqua
Matricaria maritima var. agrestis
Orobanche ludoviciana
Petandra virginica
Polygonum bicorne
Prenanthes racemosa
Spiranthes ovalis
Stachys hyssopifolia var. ambigua

1975-1976 MISSOURI FUR HARVEST

Species	Number Pelts
Raccoon	276,524
Opossum	91,611
Muskrat	89,727
Coyote	14,243
Grey Fox	9,310
Mink	5,863
Red Fox	3,337
Striped Skunk	2,983
Beaver	2,320
Bobcat	911
Badger	127
Spotted Skunk	124
Weasel	58
TOTAL	497,138

COMMON BIRDS OF ST. LOUIS COUNTY

- Baltimore oriole
- Blackbirds
  - Cowbird
  - Red-winged
  - Bronzed Grackle
- Bluebird
- Cardinal
- Catbird
- Chickadee
- Chimney Sweep
- Crow
- Field Sparrow
- Flycatchers
- Herons
  - Great blue
  - Little green
  - American bittern
  - American egret
- Horned lark
- Meadow lark
- Mourning dove
- Nuthatch
- Ovenbird
- Phoebe
- Purple martin
- Rails
  - Sora
  - Virginia
- Red-eyed vireo
- Redstart
- Robin
- Rose brown grosbeak
- Sparrow hawk
- Tanagers
  - Scarlet
  - Summer
- Titmouse
- Towhee
- Turkey vulture
- Warblers
- Whippoorwill
- Woodpeckers
  - Red-bellied
  - Downy
  - Hairy
  - Flicker
- Wood pewee
- Wood thrush
- Wrens
  - House
  - Carolina
- Yellow dove
- Yellow throat
- Yellow warbler

IMPORTANT HOOK AND LINE FISHES IN MISSOURI

Common Name	Scientific Name
Rock Bass Goggle-eye, shaddow	Ambloplites rupertris
Warmouth Sunfish Goggle-eye, redear bass	Chaenobryttus coronaris
Bluegill Sunfish Bream, brim, pondperch	Lepomis macrochirus
Green Sunfish Black perch, goggle-eye	Lepomis cyanellus
Longear Sunfish Red-belly, bream, tobacco box	Lepomis megalotis
Redhorses (5 kinds) Mullet, yellow sucker	Genus maxostoma
Carp German, mirror, leather	Cyprinus carpio
Freshwater Drum Sheepshead, stone perch croaker, white perch	Aplodinatus grunniens
Rainbow Trout	Salmo gairdneri
Smallmouth Bass Bronzeback, redeye, brownie	Micropterus dolomieui
Spotted Bass Kentucky bass	Micropterus punctulatus
Largemouth Bass Line sides, green and black	Micropterus salmoides
White Bass Stripped, sand, silver	Roccus chrysops
Channel Catfish Fiddler, spotted, cat	Ictalurus punctatus
Blue Catfish Fulton, chuckle-head	Ictalurus furcatus
Flathead Catfish Shovelhead, yellow, mudcat	Pilodictis olivaris

MIL-P-22332B
15 December 1972
SUPERSEDING
MIL-P-22332A
17 December 1962

MILITARY SPECIFICATION

PAINT, PRIMING, EXTERIOR AND INTERIOR (FOR AMMUNITION)

This specification has been approved by the Naval Ordnance Systems Command, Department of the Navy.

*1. SCOPE

1.1 Scope. This specification covers a quick drying, rust inhibiting, lacquer resisting primer for coating interior and exterior surfaces of ammunition and rockets. It provides for two compositions, one of which is suitable for use under Air Pollution Regulations (see 6.6).

*1.2 Classification. The primer covered by this specification shall be of the following compositions as specified (see 6.2):

Composition G - For use where Air Pollution Regulations do not apply.
Composition L - For use where Air Pollution Regulations are in force.

*2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

TT-E-489	Enamel Alkyd, Gloss, (for Exterior and Interior Surfaces)
TT-P-143	Paint, Varnish, Lacquer and Related Materials; Packaging, Packing and Marking of

TT-P-375	Pigment, Indian Red and Bright Red (Iron Oxide) Dry, (for Use in Protective Coatings)
TT-P-465	Pigment, Zinc-Yellow (Zinc Chromate) Dry
TT-S-735	Standard Test Fluids; Hydrocarbon
TT-T-266	Thinner: Dope and Lacquer (Cellulose Nitrate)
TT-T-291	Thinner, Paint, Volatile Mineral Spirits (Petroleum Spirits)
TT-T-306	Thinner, Synthetic Resin Enamel
TT-X-916	Xylene (for Use in Organic Coatings)
PPP-T-60	Tape, Pressure-Sensitive Adhesive, Waterproof, for Packaging

STANDARDS

Federal

FED-STD-141	Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing
FED-STD-595	Colors

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-286	Propellant, Solid, Sampling, Examination and Testing

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Qualification. The primer furnished under this specification shall be a product which is qualified for listing on the applicable Qualified Products List at the time set for opening of bids (see 6.4). Any change in the formulation of a qualified product will necessitate its requalification. The material supplied under contract shall be identical, within manufacturing tolerances, to the product receiving qualification.

3.2 Color. The color of the primer shall not be lighter than color 30109 nor darker than color 30111 of FED-STD-595.

3.3 Composition.

3.3.1 Pigment. The pigment portion of the primer shall conform to the requirements of table I when tested as in 4.4.2. The iron oxide shall conform to TT-P-375 and the zinc chromate to TT-P-465.

Table I

QUANTITATIVE REQUIREMENTS OF PIGMENT

Pigment	Percent by weight	
	Minimum	Maximu
Zinc chromate ($CrO_3 \times 2.4$)	10	12
Iron oxide (Fe_2O_3 by analysis)	50	55
Siliceous extenders	-	40
Sum of percentages of iron oxide (Fe_2O_3) and zinc chromate ($CrO_3 \times 2.4$) and acid insoluble siliceous material	90	-

3.3.2 Vehicle.

3.3.2.1 Composition G. The vehicle shall be a resin modified, dryin oil phthalic alkyd resin conforming to the requirements of table II together with the necessary amounts of driers and volatile aromatic sol vents to meet the requirements of this specification. Small amounts of antioxidants, wetting agents, and stabilizers may be used. The volatil material shall contain no benzene, methanol, chlorinated solvent or oth solvent of highly toxic nature.

*Table II

CHARACTERISTICS OF ALKYD RESIN

Characteristics	Requirements	
	Minimum	Maximum
Alkyd resin solution:[1]		
Total solids, percent by weight[2]	49	51
Viscosity (Gardner)	U	Y
Color (Gardner Color Standards of 1953)	-	14
Alkyd resin solids:		
Phthalic anhydride, percent by weight	38	-
Unsaponifiable matter, percent by weight	-	5
Oil acids, percent by weight	32	-
Acid number	-	32

[1] For composition G the volatile portion of the resin shall be xylene. For composition L the volatile portion shall conform to 3.3.2.2.

[2] An alkyd resin manufactured at higher solids content may be used provided the resin conforms to the viscosity and color requirements on reduction with xylene for composition G and with volatiles conforming to 3.3.2.2 for composition L.

*3.3.2.2 Composition L. The vehicle shall be the same as in 3.3.2.1 except the volatile solvents used shall conform to the following requirements by volume when tested as in 4.4.3.

(a) Aromatic compounds with eight or more carbon atoms except ethylbenzene: 8 percent maximum.

(b) Ethylbenzene and toluene: 20 percent maximum.

(c) Solvents with an olefinic or cyclo-olefinic type of unsaturation: negative test (see 6.7).

(d) Ketones: negative.

(e) Total of a + b: 20 percent maximum.

3.4 Quantitative requirements. The primer shall conform to the quantitative requirements of table III when tested as in 4.4.

3.5 Qualitative requirements.

3.5.1 Condition in container. A freshly opened full container of the primer, when tested as in 4.4.6, shall be free from grit, seeds, skins, lumps, abnormal thickening, or livering and shall show no more pigment settling or caking than can be readily reincorporated to a smooth homogeneous state.

Table III

QUANTITATIVE REQUIREMENTS OF PRIMER

Characteristics	Requirements	
	Minimum	Maximum
Total solids, percent by weight of primer	60	-
Pigment, percent by weight of primer	38	42
Vehicle solids, percent by weight of primer	19	22
Pigment volume, percent of total solids volume	-	45
Phthalic anhydride, percent by weight of vehicle solids	38	-
Unsaponifiable matter, percent by weight vehicle solids	-	5
Oil acids, percent by weight of vehicle solids	32	-
Flash point, closed cup, °F	75	-
Water, percent by weight of primer	-	1.0
Coarse particles and skins (retained on No. 325 mesh sieve), percent by weight of pigment	-	0.5
60-degree specular gloss	2	15
Viscosity (package), Krebs-Stormer shearing rate 200 rpm:		
Grams	125	175
Equivalent KU	67	77
Viscosity (reduced) No. 4 Ford cup, seconds	15	25
Fineness of grind	5	-
Drying time, air dry, minutes:		
Set to touch	3	6
Dry hard	-	15
Dry after-tack-free	-	20
Dry through	-	25
Drying time, baking:		
Full hardness, minutes at 250° F or equivalent heat treatment	-	30

3.5.2 Storage stability.

3.5.2.1 Partially full container. A three-quarter filled, closed 8-ounce glass jar of the primer shall show no skinning when tested as in 4.4.7.1. After aging as in 4.4.7.1 the primer shall show no livering, curdling, hard caking, or gummy sediment. It shall mix readily to a smooth homogeneous state and any skin formed shall be continuous and easily removed.

3.5.2.2 Full container. A full quart container of the primer shall show no skinning, livering, curdling, hard, dry caking, nor tough, gummy sediment when tested as in 4.4.7.2. The primer shall remix readily to a smooth homogeneous state, shall have a maximum viscosity of 89 KU, and shall meet all other requirements of the specification.

3.5.3 Dilution stability. When tested as in 4.4.8, the primer shall remain stable and uniform showing no precipitation, curdling, or separation. Slight pigment settling shall be permitted.

3.5.4 Suspension properties. The primer shall show no more than slight settling, no caking, and shall redisperse to a smooth, homogeneous state when tested as in 4.4.9.

3.5.5 Spraying properties. The primer, when tested as in 4.4.10, shall spray satisfactorily in all respects, and shall show no running, sagging, or streaking. The dried film shall show no dusting, mottling, or color separation and shall present a smooth uniform finish free from seeds.

3.5.6 Flexibility. A film of the primer tested as in 4.4.11 shall withstand bending without cracking or flaking.

3.5.7 Adhesion. A film of primer tested as in 4.4.12 shall show no removal of the primer by the adhesive tape beyond one-sixteenth inch on either side of the score line.

3.5.8 Knife test. A film of primer tested as in 4.4.13 shall be hard and tough and shall adhere tightly to the metal panel. It shall be difficult to furrow off with the knife and shall not flake, chip, or powder. The knife cut shall show beveled edges.

3.5.9 Water resistance. A film of the primer tested as in 4.4.14 shall show no wrinkling or blistering immediately after removal of the panel from water. The primer shall be no more than slightly affected when examined 2 hours after removal; and after 24 hours air-drying, the portion of the panel which was immersed shall be almost indistinguishab. from the portion which was not immersed, with regard to hardness, and shall show a color change equivalent to a lightness index difference not exceeding 2.5 units.

3.5.10 Hydrocarbon fluid resistance. A film of the primer tested as in 4.4.15 shall show no wrinkling or blistering immediately upon removal of the panel. After 24 hours air-drying, the portion of the panel which was immersed shall be almost indistinguishable from a panel prepared at the same time but not immersed with regard to hardness, color, and gloss

3.5.11 Lacquer resistance. A film of primer tested as in 4.4.16 shal show no bleeding, blistering, wrinkling, film irregularities, or other evidence of lifting. The system shall have a gloss of not less than 90 percent of the gloss of the white test lacquer applied over glass and shall show satisfactory adhesion between lacquer and primer and between primer and metal.

3.5.12 Enamel resistance. A film of primer tested as in 4.4.17 shall show no blistering, wrinkling, or other evidence of lifting. The system shall have a gloss of not less than 90 percent of the gloss of the olive drab enamel applied over glass and shall show satisfactory adhesion between enamel and primer and between primer and metal.

3.5.13 Salt spray resistance. A film of primer tested as in 4.4.18 and examined immediately after removal from the salt spray test shall show no more than a trace of rusting (No. 9-1 Method 6451 of FED-STD-141 and no more than five scattered blisters none larger than 1 mm in diameter. On removal of the primer there shall be no more than a trace of rusting, pitting, or corrosion of the steel.

3.5.14 Weather resistance. Panels exposed as in 4.4.19 shall show no rusting, cracking, checking, flaking, or loss of adhesion after 18 months exposure. On removal of the coating system, the surface of the metal shall show no more than a trace of rusting, pitting, or corrotion (No. 9-1 Method 6451 of FED-STD-141).

3.5.15 Reactivity. When subjected to the vacuum stability test as in 4.4.20, the reactivity of the primer with the explosives listed in table IV shall not exceed 3.0 milliliters of gas over and above that generated by the controls.

*Table IV

HIGH EXPLOSIVES

(a) HBX-type explosive (1) Either HBX-1, HBX-3, or H-6 (b) Composition A-3 (c) Composition B-type explosive (1) (d) Either Composition B-4, Composition B, or cyclotol (e) Composition C-4	(f) TNT or tritonal (1) (g) Tetryl (h) Black powder (i) Octol (j) MOX-2B (k) Composition A-5, HMX blend

3.5.16 Corrosion. Panels tested as in 4.4.21 shall show no evidence of corrosion within one-eighth inch of the edge and shall show no breaks or cracks in the film.

3.5.17 Ignition. When tested as in 4.4.22, mixtures of the dried paint film and the explosives listed in table V shall give ignition temperatures at or above those shown below for two consecutive tests.

Table V

IGNITION TEMPERATURES

Explosives	Minimum ignition temperature
HBX	175° C
Composition B	175° C
TNT	200° C
Tetryl	150° C
Composition A	190° C

4. QUALITY ASSURANCE PROVISIONS

*4.1 Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements specified herein. Except as otherwise specified in the

contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to assure supplies and services conform to the prescribed requirements.

4.2 Sampling, inspection, and testing. Unless otherwise specified, sampling, inspection, and testing shall be in accordance with method 1031 of FED-STD-141.

4.3 Classification of tests. Testing under the specification shall be for the purpose of:

(a) Qualification: Qualification tests are those tests performed on samples submitted for approval as qualified products.

(b) Acceptance tests: Acceptance tests are tests performed on individual lots which have been submitted for acceptance.

4.3.1 Qualification.

4.3.1.1 Sampling instructions. Qualification test samples of the composition for which qualification is desired shall consist of four 1-quart samples of the primer, 1 pint of the resin vehicle, selected as required by FED-STD-141, instructions for reducing the primer for application, and baking instructions. The manufacturer shall also supply a certified statement of composition and prior tests, except for:

(a) Reactivity
(b) Corrosion
(c) Ignition.

The statement shall show that the primer complies with the requirements of this specification. Samples shall be identified as required and forwarded to the activity responsible for qualification, designated in the letter of authorization from the activity responsible for the Qualified Products List (see 6.4).

4.3.2 Qualification tests. Qualification tests shall consist of all tests of table VI (see 6.4).

*Table VI

INDEX

Tests	Test method		Paragraph of this specification giving requirements
	Applicable method in FED-STD-141	Paragraph of this specification giving further references	
Analysis of pigment	7331	-	Table I
Isolation of vehicle (supercentrifuge)	4032	-	-
Benzene	5091	-	3.3.2
Methanol	5133	-	3.3.2
Chlorinated solvents	5132	-	3.3.2
Aromatic hydrocarbon	-	4.4.3.2	3.3.2.2
Olefinic and cyclo-olefinic compounds	-	4.4.3.3	3.3.2.2
Ketones	-	4.4.3.4	3.3.2.2
Color of transparent liquids	4248	-	Table II
Acid number	5072	-	Table II
Total solids	4041	-	Table III
Pigment solids	4022	-	Table III
Vehicle solids	4052	-	Table III
Pigment volume	4312	-	Table III
Phthalic anhydride	7014	-	Table III
Unsaponifiable	7014	-	Table III
Oil acids	7014	-	Table III
Flash point	4293	-	Table III
Water	4082	-	Table III
Coarse particles and skins	4092	-	Table III
Specular gloss	6101	-	Table III
Viscosity:			
Package	4281	-	Table III
Reduced	4882	4.4.4	Table III
Fineness of grind	4411	-	Table III
Drying time:			
Set to touch	4061	4.4.5	Table III
Dry hard	4061	4.4.5	Table III
Dry after-tack-free	4061	4.4.5	Table III
Dry through	4061	4.4.5	Table III
Condition in container	3011	4.4.6	3.5.1
Storage stability:			
Partially full container	3021	4.4.7.1	3.5.2.1
Full container	3022	4.4.7.2	3.5.2.2
Dilution stability	4203	4.4.8	3.5.3

*Table VI (contd)

INDEX

Tests	Test method		Paragraph of this specification giving requirements
	Applicable method in FED-STD-141	Paragraph of this specification giving further references	
Suspension properties	-	4.4.9	3.5.4
Spraying properties	4331	4.4.10	3.5.5
Flexibility	6221	4.4.11	3.5.6
Adhesion	-	4.4.12	3.5.7
Knife test	6304	4.4.13	3.5.8
Water resistance	6011	4.4.14	3.5.9
Hydrocarbon resistance	6011	4.4.15	3.5.10
Lacquer resistance	-	4.4.16	3.5.11
Enamel resistance	-	4.4.17	3.5.12
Salt spray resistance	6061	4.4.18	3.5.13
Weather resistance	6160	4.4.19	3.5.14
Reactivity	-	4.4.20	3.5.15
Corrosion	-	4.4.21	3.5.16
Ignition	-	4.4.22	3.5.17

4.3.3 Acceptance tests. Acceptance tests shall consist of all tests of table VI with the following exceptions unless otherwise deemed necessary by the procuring activity.

(a) Storage stability
(b) Weather resistance
(c) Reactivity
(d) Corrosion
(e) Ignition.

Failure of a sample to comply with any of the requirements of this specification shall result in the rejection of the lot of material represented

4.3.3.1 Examination of filled containers. A sample of filled containers shall be taken at random in accordance with MIL-STD-105 at inspection level I, acceptable quality level of 1.5 percent defective, to verify compliance with the product specification in regards to fill, closure, markings, and other requirements not involving tests.

4.4 Test methods.

4.4.1 Test conditions. The routine and referee testing conditions shall be in accordance with Section 7 of FED-STD-141 except as otherwise specified herein.

4.4.2 The following tests shall be conducted in accordance with FED-STD-141 and as hereinafter specified.

*4.4.3 Solvent analysis for composition L.

*4.4.3.1 Separation of volatile portion. Pour about 15 grams of the vehicle into a 50-ml distilling flask. Add 10 ml of tricresyl phosphate and several antibumping stones or Berl saddles. Fit a release valve into the mouth of the flask and attach a delivery tube to the side arm, extending into a receiver consisting of a test tube (20 × 150 mm) with side arm for attaching to a vacuum pump. The glass delivery tube should reach 1-1/2 inches from the bottom of the tube. Immerse the receiver in a Dry Ice-acetone bath. Preheat a silicone oil bath to 180° Celsius (C). Raise the oil bath until the oil reaches the sample level. Reduce the pressure slowly to 10 mm of mercury. After all solvent has distilled, carefully release the vacuum using the valve that is connected to the distilling flask. Reserve the collected distillate for the aromatic solvent determination and the test for ketone, olefinic, and cyclo-olefinic compounds.

*4.4.3.2 Determination of aromatic hydrocarbons.

Apparatus: A gas chromatograph equipped with a thermal conductivity detector.

Column preparation: Two lengths of 1/4-inch copper tubing, 6 ft and 18 ft long, are packed with 35 percent N,N-bis (2-cyanoethyl) formamide on 60- to 80-mesh Chromosorb P.

Operating conditions:

	6 ft	18 ft
Detector cell temperature, °C	300	300
Detector cell current, ma	150	150
Injection port temperature, °C	300	300
Helium flow at exit, cc/minute	175	110
Column temperature, °C	125	100

*4.4.3.2.1 Total aromatic content - procedure A. Transfer precisely 3 ml of distillate or thinner to a 25-ml glass-stoppered volumetric flask and add exactly 0.3 ml of high purity phenylcyclohexane. While cooling the graduate under tap water, add 15 ml of 85 percent sulfuric acid slowly. After all the acid has been added, shake vigorously for 2 minutes and allow the layers to separate. Add sufficient 85 percent acid to force the top layer into the neck of the flask and then transfer most of the top layer to a micro-separatory funnel. Wash the distillate with 5-ml portions of distilled water until all acid has been removed and reserve the washed solvent for chromatographic analysis. Install the 6-ft column and follow the operating conditions described above. Inject about 5 microliters of the acid-treated sample and allow the chromatogram to develop until the internal standard, phenylcyclohexane, emerges.

$$\% \text{ total aromatic solvents, v/v} = \frac{A \times 10^{*} \times 1.07^{**}}{B}$$

where

A = area of aromatic solvent peaks
B = area of internal standard peaks
* = percent of internal standard
** = detector response correction factor.

NOTE: If the above determination exceeds 8 percent, continue with the following procedure:

*4.4.3.2.2 Toluene and ethylbenzene - procedure B. Treat 3 ml of solvent in the same manner as described in procedure A except substitute benzene for phenylcyclohexane. Install the 18-ft column and follow the operating conditions described for that column. Inject about 3 microliters of sample and allow the chromatograph to develop until all of the xylene isomers appear. Purge the column by raising the column temperature to 120° C. After the high boiling materials emerge, reset the column temperature to 100° C. Calculate the percent of toluene and ethylbenzene as follows:

$$\% \text{ toluene, v/v} = \frac{(\text{area of toluene peak})(1.017)^{*}\ (10)^{**}}{(\text{area of benzene peak})}$$

$$\% \text{ ethylbenzene, v/v} = \frac{(\text{area of ethylbenzene peak})(1.054)^{*}\ (10)^{**}}{(\text{area of benzene peak})}$$

where

* = the correction factor for the detector response
** = the percentage of internal standard added.

NOTE: Sensitivity of the instrument should be adjusted to keep peaks from running off the scale. Appropriate corrections must be made for changes in sensitivity when computing the peak areas.

*4.4.3.3 Test for olefinic or cyclo-olefinic compounds. Take two test tubes and place 2 drops of the distillate in each. Dissolve the first sample in 1 ml of carbon tetrachloride and add 1 drop of 1 percent bromine in carbon tetrachloride. Shake and allow to set for 5 minutes. A positive test is indicated by the complete absence of yellow color when observed against a white background. Dissolve the second sample in 1 ml of acetone and add 1 drop of 1 percent permanganate solution (1 gram of potassium permanganate crystals in 95 ml of acetone and 5 ml of water). Shake and allow to set for 2 minutes. A positive test is indicated by the decolorization of the purple solution. The solvent is considered to fail the test for olefinic and cyclo-olefinic compounds if either of the above tests is positive (see 3.3.2.2 and 6.7).

*4.4.3.4 Test for ketones.

*4.4.3.4.1 Reagent. Two grams of 2,4-dinitrophenylhydrazine + 4 ml of concentrated sulfuric acid + 30 ml methanol (add slowly) + 10 ml water.

*4.4.3.4.2 Procedure. Pipette 1 ml of reagent into a 20- × 170-mm test tube. Add 10 drops of distillate (see 4.4.3.1) and shake for 30 seconds. A yellow precipitate or cloud in the reagent layer indicates the presence of ketones. Run a blank using 1 ml of reagent and 10 drops of mineral spirits.

*4.4.4 Viscosity (reduced). Reduce three parts by volume of primer with one part by volume of thinner conforming to TT-T-306, except thinner used with composition L shall conform to table VII, and tested as in method 4282 of FED-STD-141. Check for compliance with table III.

4.4.5 Drying time. Using a 0.002-inch film applicator (0.004-inch gap clearance) draw down a 2-inch-wide film of the primer on a clean plate glass panel. Determine drying time under referee conditions as in method 4061 of FED-STD-141 for compliance with table III.

*Table VII

THINNER FOR COMPOSITION L

Ingredient	Percent by weight
VMP Naphtha (8 percent maximum aromatic)	65
n-Butyl alcohol	20
Toluene	15

4.4.6 Condition in container. Determine package condition on acceptance testing as in method 3011 of FED-STD-141 and observe for compliance with 3.5.1. On qualification testing, evaluate pigment settling or caking by proceeding as in method 3011 of FED-STD-141, but do not sti Reseal and then agitate the can for 3 minutes on a paint shaker.[1] On re-examination of the contents, the disclosure of any gel bodies or undispersed pigment indicates unsatisfactory settling properties.

4.4.7 Storage stability.

4.4.7.1 Partially full container. Determine skinning after 48 hours as in method 3021 of FED-STD-141 and observe for compliance with 3.5.2.1 Reseal and age for 7 days at 60° C and observe for compliance with 3.5.2.1.

4.4.7.2 Full container. In accordance with method 3022 of FED-STD-141, allow a full standard quart of the primer to stand undisturbed for 6 months and then examine the contents. Evaluate pigment settling or caking as in 4.4.6 except agitate the can for 5 minutes on the paint shaker prior to re-examination. Determine viscosity and make other applicable tests for compliance with 3.5.2.2.

4.4.8 Dilution stability. Reduce one part by volume of primer as packaged with one volume of thinner. For composition L the thinner shall conform to table VII and for composition G to the following composition:

	Parts by volume
Xylene, TT-X-916, grade B	25
Mineral spirits, TT-T-291, grade 1	75

[1] An apparatus of this type, powered by a 1/4-hp motor, operates at a rate of 1350 shakes per minute and is manufactured by Red Devil Tools, Irvington, N. J.

Allow to stand 24 hours and observe for incompatibility as in method 4203 of FED-STD-141. Then flow the primer over a clear plate glass, and examine in both the wet and dry condition for compliance with 3.5.3.

4.4.9 Suspension properties. Reduce the primer as in 4.4.4. Place 6 ounces of the reduced material in an 8-ounce glass jar and do not agitate or disturb for 24 hours. At the end of this period, examine the material for hard or excessive settling by means of a spatula. Do not stir. Restopper the jar and shake vigorously for 20 seconds. Re-examine the material for any evidence of non-homogeneity or undispersed pigment and observe for compliance with 3.5.4.

4.4.10 Spraying properties. Reduce the primer as in 4.4.4. Spray on a steel panel to a dry film thickness between 0.0009 and 0.0011 inch and observe for spraying properties as in method 4331 of FED-STD-141 for compliance with 3.5.5. For referee test use automatic application per method 2131 of FED-STD-141.

4.4.11 Flexibility. Determine flexibility as in method 6221 of FED-STD-141. Draw down a 2-inch-wide film of primer with a film applicator that will give a dry film thickness of 0.0009 to 0.001 inch on a smooth finish steel panel solvent cleaned as in method 2011 of FED-STD-141 using the aliphatic naphtha-ethylene glycol monoethyl ether mixture. The panel shall be prepared from new cold rolled carbon steel rust-free 0.010 ± 0.001 inch thick with a Rockwell 15-T maximum hardness of 82 and finished with a surface roughness of 8 to 12 microinches. Air dry 1/2 hour; then bake the panel for 24 hours at 150° ± 2° C (221° ± 4° Fahrenheit (F)). Condition the panel for 1/2 hour under referee conditions. Bend over a 1/4-inch mandrel, and examine the panel for compliance with 3.5.6.

4.4.12 Adhesion. Using a 0.002-inch (0.004-inch film applicator) draw down a 2-inch-wide film of the primer on a steel panel that has been sanded with 6/0-220 silicon carbide paper and solvent cleaned as in method 2011 of FED-STD-141, using the aliphatic naphtha-ethylene glycol monoethyl ether mixture. Air dry the specimen for 1 hour under referee conditions and then score a line through to the metal across the width of the film using a sharp pointed knife. The film shall then be taped perpendicular to and across the score line with water resistant, pressure sensitive adhesive tape (3/4-inch width) conforming to the requirements of PPP-T-60, Type IV. The tape shall be pressed in firm contact with the film and shall extend for approximately 1 inch on each side of the score line. All air bubbles shall be rolled out by firm pressure of the thumb. Allow approximately 10 seconds for the test area to return to room temperature. Grasp a free end of the tape and at a rapid speed strip it from the specimen by pulling the tape back upon itself at 180°. Observe the specimen for compliance with 3.5.7.

4.4.13 Knife test. Prepare a film of primer as in 4.4.12, and air dry for 72 hours. Perform the knife test as in method 6304 of FED-STD-141 and observe for compliance with 3.5.8.

4.4.14 Water resistance. Prepare a film of primer as in 4.4.12, and air dry for 72 hours. All exposed, uncoated metal surfaces shall be coated with wax, and the panel shall be immersed for 18 hours in distilled water at 23° ± 1° C as in method 6011 of FED-STD-141. On removal, observe the panel for compliance with 3.5.9. Examine the panel for color change by measuring the directional reflectance (method 6121) before and after exposure. Calculate the amount of color change, expressed as lightness index difference (ΔL), in NBS units using method 6122 of FED STD-141. Check test results for compliance with 3.5.9.

4.4.15 Hydrocarbon fluid resistance. Prepare a film of primer as in 4.4.12, and air dry 72 hours. Do not wax or coat the exposed metal surfaces. Immerse the panel for 4 hours in a hydrocarbon fluid conforming to TT-S-735, Type III. Upon removal examine for compliance with 3.5.10.

4.4.16 Lacquer resistance. Prepare four panels of the primer as in 4.4.12. Allow to air dry 15 minutes, 1 hour, 24 hours, and 96 hours, respectively, and then spray a wet coat of white test lacquer (table VIII) over the specimens and over a glass panel. The dry film thickness of the test lacquer shall be 0.0009 to 0.0011 inch. The dry film thickness of the primer-lacquer system shall be 0.0017 to 0.0019 inch. The test lacquer shall be prepared for spraying at room temperature by reducing two parts by volume of lacquer with one part by volume of lacquer thinner conforming to TT-T-266. After the lacquer topcoat has air dried 24 hours, examine for lifting; compare 60° specular gloss with that of the lacquer on glass, and check for compliance with 3.5.11. Allow the specimens to air dry 1 week after recoating, and determine adhesion between lacquer and primer and between primer and steel using the knife test of method 6304 of FED-STD-141. Check for compliance with 3.5.11.

4.4.17 Enamel resistance. Prepare two panels of the primer as in 4.4.12. Allow one to dry 1 hour and the other 24 hours, and then spray a wet coat of olive drab gloss enamel conforming to TT-E-489, class A, over the test specimens and over a glass panel. The dry film thickness of the enamel shall be 0.0009 to 0.0011 inch. The dry film thickness of the primer-enamel system shall be 0.0017 to 0.0019 inch. The enamel shall be prepared for spraying by reducing eight parts by volume of enamel to one part by volume of thinner conforming to TT-T-306. After the topcoat has air dried 24 hours, examine for evidence of lifting; and after 48 hours, compare the 60° specular gloss with that of the enamel on glass, and check for compliance with 3.5.12. Allow the specimens to air dry 1 week after recoating, and determine the adhesion between

enamel and primer and between primer and steel using the knife test as in method 6304 of FED-STD-141. Observe for compliance with 3.5.12.

Table VIII

TEST LACQUER (HOT SPRAY TYPE)

Ingredient	Percent by weight
White dispersion[1]	18
Cellulose nitrate RS 1/2 second (70 percent in ethanol)	10
Alkyd resin (65 percent xylene)[2]	14
Dioctyl phthalate	3
Butyl acetate	25
Butyl Cellosolve	8
Butyl alcohol	9
Xylene	13

[1]Shall consist of the following:

Rutile titanium dioxide	60.0
RS 1/2 second nitrocellulose	8.0
Ethyl alcohol	3.5
Ethyl acetate	16.0
Toluol	12.5

[2]Shall contain the following:

Non-drying phthalic alkyd resin:	
Phthalic anhydride	35
Castor oil	45

4.4.18 Salt spray resistance. Prepare three 4- × 12-inch steel panels which have been solvent cleaned and sanded as in 4.4.12. Reduce the primer as in 4.4.4, and spray the panels to a dry film thickness of 0.0009 to 0.0011 inch. Air dry for 96 hours, and coat edges and uncoated metal surfaces with wax or other suitable coating. Do not score. Expose the unscored panels to 5 percent salt spray for 48 hours as in method 6061 of FED-STD-141. Upon removal, wash the panels gently in running water not warmer than 100° F until free from any visible salt deposits, and examine immediately for compliance with 3.5.13. Strip the primer film from the panels by means of lacquer thinner, and inspect steel for rust, pitting, or corrosion, and check for compliance with 3.5.13.

4.4.19 Weather resistance. Prepare two unscored 4- × 12-inch test specimens of the primer as in 4.4.18. Allow to air dry 24 hours, and spray a coat of olive drab enamel conforming to TT-E-489, class A, to a dry film thickness of 0.0009 to 0.0011 inch. Allow to air dry 72 hours, and place on outdoor exposure for 18 months at an angle of 45° facing south in the latitude of Washington, D. C. Then strip the primer film from the metal, and inspect for compliance with 3.5.14.

4.4.20 Reactivity. Determine the reactivity of the paint in contact with the explosives listed in table IV using the vacuum stability test. The reactivity shall be determined before and after storage for 60 days at 71° C and ambient relative humidity and at 71° C and 100 percent relative humidity. The 100 percent relative humidity test shall not be made on the black powder and MOX-2B which are deteriorated by moisture. Prepare the samples as specified in 4.4.20.1.

4.4.20.1 Preparation of samples. A sufficient amount of the paint to provide approximately 140 grams of dried film shall be poured on glass or stainless steel plates. The films shall be air dried under ambient conditions for 48 hours, or until no longer tacky, and then peeled off with a sharp edged tool in strips. These strips are then suspended on glass rods in an oven or cabinet with circulating air at a temperature not to exceed 30° C for 48 hours. If an air circulating oven is not available, it will be satisfactory to place the suspended strips before a fan in a warm room for 48 hours. The paint strips are then removed, cut into smaller pieces, and then ground in a mortar fine enough to pass through a 16-mesh sieve. The explosives shall be reduced by grinding or rasping to a fineness of 20 mesh or less. The black powder shall not be ground, but is to be used in the granulation furnished for the test. Ten samples shall then be prepared consisting of 10 grams of each of the explosives listed in table IV (with the exception of black powder and MOX-2B) with 10 grams of the paint. With the black powder and the MOX-2B, 7.0 grams of each shall be mixed with 7.0 grams of paint. The mixing shall be thorough using a wood spatula with the mixture on a piece of glazed paper. After mixing, the mixtures shall be spread out on large watch glasses, and dried in a desiccator at room temperature for 24 hours. They are then placed in dry glass bottles with rubber or cork stoppers and reserved for tests. At the same time, 10-gram samples of each of the explosives and a 20-gram sample of the paint are prepared and bottled in the same way. Samples are taken directly from these bottles to make the initial vacuum stability and ignition tests as required in sections 4.4.20.3 and 4.4.22. For the storage tests, the remainder of the mixed samples and controls, after the initial tests, are divided into equal portions and placed in separate bottles. One series of the samples is arranged, unstoppered, in individual mason jars, sealed under ambient conditions, and placed in a surveillance oven at 71° C. The other series of mixtures and controls, except the black powder and MOX-2B, is placed, also unstoppered, in individual mason jars, each containing a test tube with 10 cc of water. The bottles containing the samples are protected in such a way that condensation from the top of the mason jar will not fall into the sample bottle. The jars are fitted with rubber gaskets, closed, and placed in a surveillance oven at 71° C. After 60 days the samples of both series are removed, dried in a circulating oven or cabinet at approximately 35° to 40° C for 48 hours, and tested according to sections 4.4.20.3 and 4.4.22.

4.4.20.2 Calibration. Calibration of the glass tube shall be as specified in method 403.1.1 of MIL-STD-286.

4.4.20.3 Testing procedure. The procedure shall be as specified in method 403.1.1 of MIL-STD-286 except that 2N + 2 heating tubes (where N equals the number of explosives involved) shall be selected. These tubes shall be similar to the heating tube portion of the apparatus shown in figure 1 of MIL-STD-286. Two and one-half gram portions of the dried paint, as controls, shall be added to each of two tubes, and 2-1/2 grams of each of the explosives, also as controls, shall be added to individual tubes. Five-gram samples of each of the mixtures of any one of the series prepared under 4.4.20.1, after drying for 24 hours in a desiccator at room temperature, are placed in individual tubes. After assembly the test is run as prescribed in MIL-STD-286 for 40 hours at 100° C. All readings shall be made with the sample removed from the bath and at room temperatures. The readings of both the controls and the test samples shall then be corrected to standard conditions of temperature and pressure and checked for compliance with 3.5.15.

4.4.20.4 Calculation of reactivity. The reactivity of each of the explosive materials with the coating compound shall be calculated as follows:

$$\text{Reactivity in ml gas} = C - (A + B)$$

where

C = ml of gas produced by the mixture of explosive material and coating compound

A = ml of gas produced by the explosive material alone

B = ml of gas produced by the coating compound alone.

4.4.21 Corrosion. Coat on both sides 26 smooth SAE 1020 steel panels, approximately 4 × 2 × 1/20 inches, with 0.001 ± 0.0002 inch of the primer and thoroughly dry. Using two panels for each test, make into 12 sandwiches with slabs or compressed pellets of each explosive shown in table IV. The slabs or pellets shall be at least one-eighth inch in thickness, and shall be held in close contact with the coated surfaces of the panel by means of tying the sandwich together with a cotton string or cord. Each sandwich is then placed in a separate glass jar in an inclined position under ambient conditions, then closed and placed in a controlled temperature oven at 71° C for 60 days. Two of the coated

panels shall be stored under the same conditions, to serve as controls for all of the explosives under tests. After 60 days the samples are removed, the panels separated from the sandwiches, and the surfaces which had been in contact with the explosives examined visually for cracks, pits, or other signs of corrosion as specified under 3.5.16. The control panels will serve as a comparison in this examination.

4.4.22 Ignition. Determine the minimum ignition temperature in duplicate on mixtures of the dried paint film and the explosives listed in table V both prior to and after storage in closed glass containers for 60 days under ambient relative humidity at 71° C and under 100 percent relative humidity at 71° C. Make the initial test on a ground dry mixture of 0.25 gram of each explosive with 0.25 gram of the paint and the final test on 0.50 gram of the ground mixtures after completion of the storage period. Determine the ignition point by raising the temperature at a rate of 5° to 10° C per minute. Check the ignition temperatures obtained for compliance with 3.5.17.

5. PREPARATION FOR DELIVERY

5.1 Packaging and packing. The primer shall be delivered in 1-quart or 1-gallon multiple friction top containers in 5-gallon lug cover steel pails or in 55-gallon steel drums as specified (see 6.2). The primer shall be packaged level A or C; packed level A, B, or C as specified (see 6.2) in accordance with TT-P-143.

5.2 Marking. The containers shall be marked in accordance with MIL-STD-129. In addition each container shall be marked with the qualification report number and composition G or L, as applicable.

6. NOTES

6.1 Intended use. This primer is intended for painting the interior of ammunition items such as bombs, shells, rockets, and mines prior to being filled with explosives. It may also be used for the exterior surfaces of these items as a primer. It is suitable for use over bare or chemically treated metal surfaces and may be used under synthetic enamel or lacquer topcoats.

*6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification
(b) Composition required (see 1.2)

(c) Size of containers required (see Section 5)
(d) Level of packaging and level of packing (see Section 5).

6.3 The primer should be purchased by volume, the unit being 1 U. S. liquid gallon of 231 cubic inches at 68° F (20° C).

*6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Ordnance Systems Command, Department of the Navy, Washington, D. C. 20360. Information pertaining to qualification of products may be obtained from the Commanding Officer, Naval Ordnance Station, Indian Head, Md. 20640, Attn: Chemical Analysis Branch.

6.5 The primer is considered to be comparable in performance to the following approximate composition by weight:

Pounds	
205	Red iron oxide (98 percent Fe_2O_3)
40	Zinc chromate ($CrO_3 \times 2.4$)
155	Fibrous acicular talc
80	39 percent phthalic anhydride, resin modified, drying oil alkyd resin; Gardner Viscosity U-Y at 50 percent solids in xylene
140	Xylene Grind 18-24 hours in a porcelain ball mill using 2-1 ratio of porcelain balls by weight and reduce as follows:
340	39 percent phthalic anhydride, resin modified, drying oil alkyd resin; Gardner Viscosity U-Y at 50 percent solids in xylene
40	Xylene
5.2	Lead naphthenate (24 percent)
1.0	Cobalt naphthenate (6 percent)
1.0	Antiskinning agent.

*6.6 Composition L primers should be specified for use in areas with regulations controlling the emission of solvents into the atmosphere.

6.7 The test for olefinic and cyclo-olefinic compounds will not be positive for solvents containing less than 1 percent of these compounds.

*6.8 The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationships to the last previous issue.

Custodians:
Army - MR
Navy - OS
AF - 84

Preparing activity:
Navy - OS
(Project No. 8010-0656)

Reviewer:
Army - MU

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 22-R255

INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comment and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.

SPECIFICATION: MIL-P-22332B, Paint, Priming, Exterior and Interior (For Ammunition)

ORGANIZATION

CITY AND STATE | CONTRACT NUMBER

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO *(If "yes", in what way?)*

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity - Optional)* | DATE

DD FORM 1 JAN 66 1426 REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

FOLD

DEPARTMENT OF THE NAVY

POSTAGE AND FEES PAID
NAVY DEPARTMENT

OFFICIAL BUSINESS

Commanding Officer
Naval Ordnance Station
Attn: Standardization Division (QA3)
Indian Head, Maryland 20640

FOLD

#1

SHML Data

Item Status: AUTHORIZED FOR SHIPBOARD USE
SHML FSC: 5820 **SHML NIIN:** 001350639
Obsolete NIIN: N **Replaced By NSN:** <blank>
Nomenclature: BUOY,PAINT KIT
COG: 9N - Tech Command, FMSO; Inventory Control Point, Defense Electronic Supply Center
Acquisition Advice Code: Y
Special MAT'L Content Code: F - Flammable Liquids flash point not more than 60ø (140øF) Click here to view Associated DOT Guide
Special MAT'L IDENT. Code: <blank>
SHML Unit of Issue: EA - Each **Unit Of Measure:** EA
Quantity Per Unit Package: 1
Shelf Life: 0 {Non-Deteriorative (Type II Extendable)}
Shelf Life Action Code: 00 - Not deteriorative. (Must always be shown when field "ShelfLife" is "0".)
Type Of Storage: G - Flammable
Specification: 2513866
SPMIG: <blank>
Remarks: <blank>

Nuclear Water Data

This is not a Nuclear Water Chemical NIIN.

Standard PMS Identification Number Data

SPIN FSC: 5820 **SPIN NIIN:** 001350639
SPIN: 3088S

MSDS Safety Information

FSC: 5820 **NIIN:** 00-135-0639 **MSDS Date:** 03/01/1989 **MSDS Num:** BJJCY
Submitter: N EN **Tech Review:** 11/05/1990 **Status CD:** C
Product ID: QUICK DRYING ENAMEL TT-E-516, 37038 BLACK **MFN:** 01
Article: N **Kit Part:** N

Responsible Party **Cage:** 77672
Name: RANDOLPH PRODUCTS CO
Address: PARK PLACE EAST
City: CARLSTADT **State:** NJ **Zip:** 07072
Country: US
Info Phone Number: 201-438-3700
Emergency Phone Number: 201-438-3700

Preparer's Name: N/P

Proprietary Ind: N Review Ind: N
Published: Y Special Project CD: N

Contractor Summary

Cage: 77672 Name: RANDOLPH PRODUCTS CO
Address: 701 12TH ST Box: 830
City: CARLSTADT State: NJ Zip: 07072-0830
Country: US Phone: 201-438-3700

Cage: 33362 Name: TEC DESIGN AND MFG CO
Address: UNKNOWN
City: UNKNOWN State: NK Zip: 00000
Country: NK Phone: UNKNOWN

Item Description Information

Item Manager: N35
Item Name: BUOY, PAINT KIT
Specification Number: NK Type/Grade/Class: NK
Unit of Issue: NK Quantitative Expression: NK
UI Container Qty: NK Type of Container:

Ingredients

Cas: Code: X RTECS #: 1000046PI Code: M
Name: PIGMENTS
% Text: 10-20 Environmental Wt:
Other REC Limits: N/K
OSHA PEL: NOT APPLICABLE Code: M OSHA STEL: Code:
ACGIH TLV: 10 MG/M3 Code: M ACGIH STEL: N/P Code:
EPA Rpt Qty: DOT Rpt Qty:
Ozone Depleting Chemical:

Cas: 1343-90-4 Code: M RTECS #: 0M4360000 Code: M
Name: MAGNESIUM SILICATE HYDRATE
% Text: 15-25 Environmental Wt:
Other REC Limits: N/K
OSHA PEL: NOT APPLICABLE Code: M OSHA STEL: Code:
ACGIH TLV: 10 MG/M3 Code: M ACGIH STEL: N/P Code:
EPA Rpt Qty: DOT Rpt Qty:
Ozone Depleting Chemical: N

Cas: 108-88-3 Code: M RTECS #: XS5250000 Code: M

Name: TOLUENE (SARA III)
% Text: 25-35 **Environmental Wt:**
Other REC Limits: N/K

OSHA PEL: 200 PPM/150 STEL	**Code:** M	**OSHA STEL:**	**Code:**
ACGIH TLV: 50 PPM; 9293	**Code:** M	**ACGIH STEL:** N/P	**Code:**
EPA Rpt Qty: 1000 LBS		**DOT Rpt Qty:** 1000 LBS	

Ozone Depleting Chemical: N

Cas: 1330-20-7 **Code:** M **RTECS #:** ZE2100000 **Code:** M
Name: XYLENES (O-,M-,P- ISOMERS) (SARA III)
% Text: 10-20 **Environmental Wt:**
Other REC Limits: N/K

OSHA PEL: 100 PPM/150 STEL	**Code:** M	**OSHA STEL:**	**Code:**
ACGIH TLV: 100 PPM/150STEL;9192	**Code:** M	**ACGIH STEL:** N/P	**Code:**
EPA Rpt Qty: 1000 LBS		**DOT Rpt Qty:** 1000 LBS	

Ozone Depleting Chemical: N

Cas: **Code:** X **RTECS #:** 1000332DU **Code:** M
Name: DRIERS
% Text: <1% **Environmental Wt:**
Other REC Limits: N/K

OSHA PEL: NOT APPLICABLE	**Code:** M	**OSHA STEL:**	**Code:**
ACGIH TLV: NOT APPLICABLE	**Code:** M	**ACGIH STEL:** N/P	**Code:**
EPA Rpt Qty:		**DOT Rpt Qty:**	

Ozone Depleting Chemical:

Cas: **Code:** X **RTECS #:** 1000Z39AR **Code:** M
Name: STYRENATED ALKYD RESIN SOLUTION
% Text: 15/25 **Environmental Wt:**
Other REC Limits: N/K

OSHA PEL: NOT APPLICABLE	**Code:** M	**OSHA STEL:**	**Code:**
ACGIH TLV: NOT APPLICABLE	**Code:** M	**ACGIH STEL:** N/P	**Code:**
EPA Rpt Qty:		**DOT Rpt Qty:**	

Ozone Depleting Chemical:

Health Hazards Data

LD50 LC50 Mixture NONE SPECIFIED BY MANUFACTURER.
Route Of Entry Inds - Inhalation: YES **Skin:** YES **Ingestion:** NO
Carcinogenicity Inds - NTP: NO **IARC:** NO **OSHA:** NO

Health Hazards Acute And Chronic

ACUTE:MAY CAUSE DROW,HDCH,DIZZ,&IRRIT OF EYES,NOSE,&THROAT. CHRONIC:EYES:IRRIT,BLURRED VISION,TEARING.SKIN:IRRIT,DEFAT,DERMAT.INHAL:DIZZ,WEAK,NAUS,HDCH.INGEST:GI IRRIT,NAUS,VOMIT, DIARR. INTENTIONAL MISUSE BY DELIB CONC AND INHALING THE CON TENTS MAY BE HRMFUL AND/OR FATAL (SEE SIGNS & SYMP)

Explanation Of Carcinogenicity

NOT RELEVANT

Signs And Symptions Of Overexposure

HLTH HAZ (CON'T): SKIN ABSORPTION: IN LIQ OR SOLN FORM, MATL MAY BE ABSORBED THROUGH INTACT SKIN & PROD TOXIC EFTS IF EXP IS PRLNGED/EXTENSIVE. REPORTS HAVE ASSOC RPTD/PRLNGED OCCUP OVEREXP TO SOLVENTS W/PERM BRAIN & NERVOUS SYS DMG.

Medical Cond Aggravated By Exposure

NONE SPECIFIED BY MANUFACTURER.

First Aid

INHAL:'IMMED MOVE VICTIM TO FRESH AIR, KEEP VICTIM QUIET, ADMIN O*2, CALL MD. EYES: FLUSH EYES WITH WATER FOR 15 MIN, CALL MD. SKIN: REMOVE CONTAM CLTHG, WASH AFFECTED AREA WITH SOAP & WATER, WASH CLTHG, & DISCARD CONTAM SHOES. INGEST: IF L G QTYS INGEST ADMIN 1 QT WARM WATER, GET MD IMMED. DO NOT INDUCE VOMIT, CAN CAUSE CHEM PNEUM.

Spill Release Procedures

EVACUATE NONESSENTIAL PERS.EXTING IGNIT SOURCES.NOTIFY FIRE, WATER SUPPLY/POLLUTION CONTROL AUTH.BLANKET SPILL W/FOAM.RESTRICT WATER USE IN CLEANUP,DIKE LG SPILL.ABSORB SM SPILL ONTO INERT SOLIDS.IF SPILL ON WATER,CONTAIN & RECOVER TO PVNT DISPERSION

Neutralizing Agent

NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods

LANDFILL ONLY AT PERMITTED DISPOSAL SITES. TAKE CARE TO AVOID BIOMASS POISONING. STORE CONTAMINATED MATERIAL AND HANDLE AS HAZARDOUS WASTE DUE TO RISK OF FIRE AND/OR EXPLOSION UNDER ADVERSE CIRCUMSTANCES. DISPOSE I/A/W FED,STATE AND LOCAL R EGS.

Handling And Storage Precautions

WEAR PROTECTIVE CLOTHING. KEEP AWAY FROM HEAT, FLAMES. KEEP AWAY FROM CHILDREN. GROUND CONTAINERS AND EQUIPMENT. DO NOT CUT OR WELD EMPTY CONTAINERS.

Other Precautions

STORE IN TIGHTLY CLOSED CNTNR/PROPERLY BLANKET W/INERTGAS TO RETARD DEVELOPMENT OF DANGEROUS PEROXIDES. KEEP AWAY FROM ALUMINUMMETAL, MAY CORRODE AND/OR GENERATE FLAM HYDROGEN GAS. ALL ELEC EQUIP SHOULDCONFORM TO THE NATIONAL ELEC CODE.

Fire and Explosion Hazard Information

Flash Point Method: TCC

Flash Point: **Flash Point Text:** 45.0F,7.2C

Autoignition Temp: **Autoignition Temp Text:** N/A

Lower Limits: 1.2 **Upper Limits:** N/K

Extinguishing Media

SAND, FOAM, CARBON DIOXIDE, CHEMICAL TYPES.

Fire Fighting Procedures

AVOID BRTHING FUMES.USE NIOSH/MSHA APPROVED SCBA&FULL PROT EQUIP WHEN HEATED ABOVE FP, MATL REL VAP. IF EXPOS TO IGNITION SOURCE IN AIR (SEE SUPP DATA)

Unusual Fire/Explosion Hazard

VAPORS REL AT HIGH TEMP WHICH CAN BURN/EXPLODE IF IGNIT AVAIL.FINE SPRAY MAY BE COMBUST BELOW NORM FL PT.VAPOR MAY TRAVEL LONG DIST TO IGNIT SOURCE&FLASH BACK.

Control Measures T

Respiratory Protection

IF USED AT ELEVATED TEMP OR UNDER MIST-FORMING CONDITIONS, USE NIOSH/MSHA APPROVED SELF CONTAINED BREATHING APPARATUS OPERATED IN A POSITIVE PRESSURE MODE.

Ventilation

USE THIS MATL ONLY WHERE GENERAL ROOM VENT CONTROLS EXPOSURES BELOW HARMFUL LEVEL BASED ON MEDICAL SURVEILLANCE.

Protective Gloves

USE NEOPRENE GLOVES TO PROTECT THE SKIN

Eye Protection

CHEM WORK GOGGS,FACESHLD OPTIONAL(FP N)

Other Protective Equipment

APRON SHOULD BE WORN. ALL SAFETY EQUIPMENT SHOULD BE CLEANED THOROUGHLY AFTER EACH USE.

Work Hygienic Practices

USE GOOD PERSONAL HYGIENE PRACTICES. WASH HANDS BEFORE EATING, DRINKING, SMOKING, & USE OF TOILET. SHOWER W/SOAP & WATER

Supplemental Safety and Health

FIRE FIGHTING PROC (CON'T): VAPOR CAN BURN IN OPEN OR EXPLODE IF CONFINED.NOTIFY AUTHORITIES IF LIQUID ENTERS SEWERS OR PUBLIC WATERS.

Physical/Chemical Properties

HCC: **NRC/State LIC No:**

Net Prop WT For Ammo:

Boiling Point: **B.P. Text:** 230F,110C

Melt/Freeze Pt: **M.P/F.P Text:** N/K

Decomp Temp: **Decomp Text:** N/K

Vapor Pres: SEE INGRED **Vapor Density:** > THAN AIR

Volatile Org Content %: **Spec Gravity:** N/K

VOC Pounds/Gallon: **PH:** N/K

VOC Grams/Liter: **Viscosity:** N/P

Evaporation Rate & Reference: SLOWER THAN ETHER

Solubility in Water: YES, AND WILL FLOAT

Appearance and Odor: COLOR: BLACK, ODOR: NOT KNOWN

Percent Volatiles by Volume: 55 **Corrosion Rate:** N/K

Reactivity Data T

Stability Indicator: YES
Stability Condition To Avoid: FLAMES OR HIGH HEAT.
Materials To Avoid: AVOID CONTACT WITH STRONG OXIDANTS.
Hazardous Decomposition Products: CARBON MONOXIDE MAY FORM WHEN BURNED.
Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization: NOT RELEVANT.

Toxicological Information

Toxicological Information: N/P

Ecological Information

Ecological: N/P

MSDS Transport Information

Transport Information: N/P

Regulatory Information

Sara Title III Information: N/P
Federal Regulatory Information: N/P
State Regulatory Information: N/P

Other Information

Other Information: N/P

HMIS Transportation Information

Responsible Party Cage: 77672
Trans ID NO: 49546
Product ID: QUICK DRYING ENAMEL TT-E-516, 37038 BLACK
MSDS Prepared Date: 03/01/1989
Review Date: 12/21/1990
MFN: 1
Submitter: N TN
Status CD: C
Article W/O MSDS: N
Tech Entry NOS Shipping Nm:
Radioactivity:
Form:
Net Explosive Weight:
Coast Guard AMMO Code:
Magnetism: N/P
Net Unit Weight:
AF MMAC Code:
DOD Exemption NUM:
Limited Quantity IND:

Multiple KIT Number: 0 **Kit IND:** N
Kit Part IND: N **Review IND:** Y
Unit Of Issue: NK **Container QTY:** NK
Type Of Container:
Additional Data:

Detail DOT Information

DOT PSN Code: LFJ **Symbols:**
DOT Proper Shipping Name: PAINT RELATED MATERIAL
DOT PSN Modifier: INCLUDING PAINT THINNING, DRYING, REMOVING, OR REDUCING COMPOUND
Hazard Class: 3 **UN ID Num:** UN1263
DOT Packaging Group: II
Label: FLAMMABLE LIQUID
Special Provision: B52,T7,T30
Packaging Exception: 150
Non Bulk Pack: 173 **Bulk Pack:** 242
Max Qty Pass: 5 L **Max Qty Cargo:** 60 L
Vessel Stow Req: B
Water/Ship/Other Req:

Detail IMO Information

IMO PSN Code: LCP
IMO Proper Shipping Name: PAINT OR PAINT RELATED MATERIAL
IMO PSN Modifier: (INCLUDING PAINT, LACQUER, ENAMEL, STAIN, SHELLAC SOLUTIONS, VARNISH, POLISH, LIQUID FILLER AND LIQUID LACQUER BASE) OR (INCLUDING PAINT THINNING OR REDUCING COMPOUND) o
IMDG Page Number: 3268 **UN Number:** 1263
UN Hazard Class: 3.2 **IMO Packaging Group:** I/II *
Subsidiary Risk Label: -
EMS Number: 3-05 **MED First Aid Guide NUM:** 310

Detail IATA Information

IATA PSN Code: SXL **IATA UN ID NUM:** 1263
IATA Proper Shipping Name: PAINT RELATED MATERIAL
IATA PSN Modifier: (INCLUDING PAINT THINNING OR REDUCING COMPOUNDS)
IATA UN Class: 3 **Subsidiary Risk Class:**
IATA Label: FLAMMABLE LIQUID
UN Packing Group: II **Packing Note Passenger:** 305
Max Quant Pass: 5L **Max Quant Cargo:** 60L
Packaging Note Cargo: 307 **Exceptions:** A7,A72

TC

Detail AFI Information

AFI PSN Code: SXI **AFI Symbols:**

AFI Proper Shipping Name: PAINT OR PAINT RELATED MATERIAL

AFI PSN Modifier: (INCLUDING PAINT,LACQUER,ENAMEL,STAIN,SHELLAC SOLUTIONS,VARNISH,POLISH,LIQUID FILLER AND LIQUID LACQUER BASE) OR (INCLUDING PAINT THINNING OR REDUCING COMPOUNDS)

AFI Hazard Class: 3 **AFI UN ID NUM:** UN1263

AFI Packing Group: II

AFI Label:

Special Provisions: P5 **Back Pack Reference:** A7.3

HMIS HAZCOM Label

Print Labels

Product ID: QUICK DRYING ENAMEL TT-E-516, 37038 BLACK

Cage: 77672 **Assigned IND:** N

Company Name: RANDOLPH PRODUCTS CO

Street: 701 12TH ST **PO Box:** 830

City: CARLSTADT **State:** NJ **Zipcode:** 07072-0830

Country: US

Health Emergency Phone: 201-438-3700

Label Required IND: Y **Date Of Label Review:** 06/12/1991

Status Code: C **MFG Label NO:**

Label Date: 06/12/1991 **Year Procured:** N/K

Origination Code: G **Chronic Hazard IND:** Y

Eye Protection IND: YES **Skin Protection IND:** YES

Signal Word: DANGER **Respiratory Protection IND:** YES

Health Hazard: Moderate

Contact Hazard: Slight

Fire Hazard: Severe

Reactivity Hazard: None

Hazard And Precautions

EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. KEEP AWAY FROM HEAT, SPARKS AND FLAME. KEEP CONTAINER CLOSED. USE WITH ADEQUATE VENTILATION. ACUTE:MAY CAUSE EYE, NOSE AND THROAT IRRITATION. AVOID CONTACT WITH EYES. WASH T HOROUGHLY AFTE HANDLING. AVOID BREATHING VAPOR. CHRONIC:TARGET ORGANS:EYES, SKIN, CNS. TOLUENE, CAS #108-88-2, APPEARS ON THE NAVY OCCUPATIONAL CHEMICAL REPRODUCTIVE HAZARDS LIST (FP N).

situation regardless of similarity to a corresponding Department of Defense or other government situation.

#2

SHML Data

This NIIN is not currently found on the SHML; it requires CO's approval prior to procurement. If procured, submit SHML feedback form to Type Commander for endorsement prior to NAVICP approval.

Nuclear Water Data T

This is not a Nuclear Water Chemical NIIN.

Standard PMS Identification Number Data T

This is not a Standard PMS Identification Number NIIN.

MSDS Safety Information T

FSC: 8010 **MSDS Date:** 03/24/1992 **MSDS Num:** BRVNX
Submitter: F BT **LIIN:** 00F029125 **Tech Review:** 08/27/1993 **Status CD:** C
Product ID: **110-925 TT-E-516 36118 GRAY ENAMEL** **MFN:** 01
Article: N **Kit Part:** N

Responsible Party **Cage:** GO238
Name: D J SIMPSON CO INC
Address: 111 S MAPLE AVE **Box:** 2265
City: SOUTH SAN FRANCISCO **State:** CA **Zip:** 94080-6303
Country: US
Info Phone Number: *415-873-5990*
Emergency Phone Number: 800-424-9300
Preparer's Name: P GANSER
Proprietary Ind: N **Review Ind:** Y
Published: Y **Special Project CD:** N

Preparer Co. when other than Responsible Party Co.

Cage: GO238 **Assigned Ind:** Y
Name: D J SIMPSON CO INC
Address: 111 S MAPLE AVE **Box:** 2265
City: SOUTH SAN FRANCISCO **State:** CA **Zip:** 94080-6303

Contractor Summary T

Cage: GO238 **Name:** D J SIMPSON CO INC
Address: 111 S MAPLE AVE **Box:** 2265
City: SOUTH SAN FRANCISCO **State:** CA **Zip:** 94080-6303
Country: US **Phone:** 415-873-5990

Cage:33244 Name:SIMPSON D J CO INC
Address:111 S MAPLE AVE Box:2265
City:SOUTH SAN FRANCISCO State:CA Zip:94080-6303
Country:US Phone:415-873-5990

Ingredients

Cas: 1330-20-7 Code: M RTECS #: ZE2100000 Code: M
Name: XYLENE, DIMETHYLBENZENE, XYLOL
% Text: 49 Environmental Wt:
Other REC Limits: 100 PPM
OSHA PEL: 100 PPM Code: M OSHA STEL: Code:
ACGIH TLV: 100 PPM, SKIN Code: M ACGIH STEL: N/P Code:
EPA Rpt Qty: 1000 LBS DOT Rpt Qty: 1000 LBS
Ozone Depleting Chemical: N

Cas: Code: X RTECS #: 9999999VO Code: M
Name: VOL ORGANIC CMPD: 4.83 LB/GL (579 G/L)
% Text: N/K Environmental Wt:
Other REC Limits: N/K
OSHA PEL: N/K Code: M OSHA STEL: Code:
ACGIH TLV: N/K Code: M ACGIH STEL: N/P Code:
EPA Rpt Qty: DOT Rpt Qty:
Ozone Depleting Chemical:

Health Hazards Data

LD50 LC50 Mixture N/K
Route Of Entry Inds - Inhalation: YES Skin: YES Ingestion: YES
Carcinogenicity Inds - NTP: NO IARC: NO OSHA: NO

Health Hazards Acute And Chronic

EXPOSURE TO DUST/FUMES OF RAW MATERIALS MAY CAUSE RESPIRATORY PROBLEMS, ANETHETIC EFFECTS, RESPIRATORY TRACT IRRITATION. SKIN: IRRITATION, BURNS, ABSORPTION, DERMATITIS. EYES: IRRITATION. INGESTION: ASPIRATION OF VOMITUS INTO LUNGS CAN CAUS E FATAL CHEMICL PNEUMONITIS. CHRONIC: PERMANENT BRAIN & NEROVUS SYSTEM DAMAGE.

Explanation Of Carcinogenicity

NONE

Signs And Symptions Of Overexposure

SKIN: DRYING, CRACKING, & SEVERE IRRITATION OR BURNING SENSATION. EYES: IRRITATION & BURNS. INHALATION: RESPIRATORY TRACT IRRITATION, HEADACHES, NAUSEA, DIZZINESS, UNCONSICOUSNESS OR COMA. INGESTION: DIZZINESS, NAUSEA.

Medical Cond Aggravated By Exposure

HEART, LUNG, KIDNEY, LIVER, SKIN DISORDERS

First Aid

INHALATION: REMOVE TO FRESH AIR. RESTORE BREATHING. ADMINISTER OXYGEN IF NEEDED. EYES: FLUSH W/PLENTY OF WATER FOR 15 MINS W/EYELIDS OPEN. SKIN: WASH W/SOAP & WATER. INGESTION: DON'T INDUCE VOMITING. DRINK ONE OR TWO GLASSES OF WATER TO DIL UTE. KEEP WAR & COMFORTABLE. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Spill Release Procedures

VENTILATE AREA. REMOVE ALL IGNITION SOURCES. CONTAIN & REMOVE W/INERT ABSORBANT & NON-SPARKING TOOLS. WEAR PROTECTIVE EQUIPMENT. CONTAIN LIQUID TO PREVENT CONTAMINATION OF SOIL & GROUND WATER.

Neutralizing Agent

N/K

Waste Disposal Methods

DISPOSE OF IN ACCORDANCE W/LOCAL, STATE, & FEDERAL REGULATIONS.

Handling And Storage Precautions

KEEP CLOSURE TIGHT & CONTAINER IN UPRIGHT POSITION. GROUND/BOND CONTAINERS DURING LIQUID TRANSFER. HANDLE WHERE VENTILATION IS ADEQUATE.

Other Precautions

AVOID BREATHING VAPORS, SKIN OR EYE CONTACT. STORE AWAYFROM HEAT OR OTHER IGNITION SOURCES. EMPTY CONTAINERS MAY STILL CONTAINHAZARDOUS MATERIAL.

==========

Fire and Explosion Hazard Information T

==========

Flash Point Method: TCC

Flash Point: **Flash Point Text:** 104F

Autoignition Temp: **Autoignition Temp Text:** N/A

Lower Limits: 1% **Upper Limits:** 7%

Extinguishing Media

FOAM, CO2, DRY CHEMICAL, WATER FOG

Fire Fighting Procedures

WEAR FULL PROTECTIVE EQUIPMENT INCLUDING SCBA. FIGHT AS VOLATILE LIQUID FIRE. USE WATER TO COOL FIRE EXPOSED CONTAINERS. AVOID SPREADING. USE FOG NOZZLES.

Unusual Fire/Explosion Hazard

CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT. VAPORS MAY TRAVEL TO IGNITION SOURCE & FLASHBACK. EMPTY CONTAINERS MAY EXPLODE DUE TO RESIDUES.

==========

Control Measures T

==========

Respiratory Protection

USE APPROVED CHEMICAL MECHANICAL FILTER RESPIRATOR

Ventilation

REQUIRED, 200 CFM MINIMUM

Protective Gloves

CHEMICALLY RESISTANT/PLASTIC/RUBBER

Eye Protection

SAFETY GLASSES W/SIDE SHIELDS

Other Protective Equipment

EYE WASH & SAFETY SHOWERS. USE HAND CREAMS.

Work Hygienic Practices

REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. WASH BEFORE HANDLING FOOD OR SMOKING. DAILY SHOWERS RECOMMENDED.

Supplemental Safety and Health

THIS PRODUCT ALSO CONTAINS LESS THAN 1% WEIGHT OF LEAD COMPOUNDS; ZIRCONIUM COMPOUNDS, ETHANOL, METHANOL & LESS THAN 0.1% WEIGHT OF CADMIUM & CRYSTALLINE SILICA WHICH ARE SUSPECTED HUMAN CARCINOGENS. LEAD HAS A CUMULATIVE TOXIC EFFECT ON TH E HUMAN BODY.

Physical/Chemical Properties

HCC: **NRC/State LIC No:**
Net Prop WT For Ammo:
Boiling Point: **B.P. Text:** 279F
Melt/Freeze Pt: **M.P/F.P Text:** N/K
Decomp Temp: **Decomp Text:** N/K
Vapor Pres: N/K **Vapor Density:** >1
Volatile Org Content %: **Spec Gravity:** 1.2
VOC Pounds/Gallon: **PH:** N/K
VOC Grams/Liter: **Viscosity:** N/P
Evaporation Rate & Reference: SLOWER THAN ETHER
Solubility in Water: N/K
Appearance and Odor: VISCOUS LIQUID W/DISTINCT SOLVENT ODOR
Percent Volatiles by Volume: N/K **Corrosion Rate:** N/K

Reactivity Data

T

Stability Indicator: YES
Stability Condition To Avoid: HEAT, ELECTRICAL EQUIPMENT, SPARKS, OPEN FLAME & OTHER IGNITION SOURCES
Materials To Avoid: STRONG OXIDIZING AGENTS, ACIDS & BASES.
Hazardous Decomposition Products: CO, CO2, OTHER OXIDES; SMOKE, FUMES
Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization: N/K

Toxicological Information

T

Toxicological Information: N/P

Ecological Information

T

Ecological: N/P

MSDS Transport Information

T

Transport Information: N/P

Regulatory Information

Sara Title III Information: N/P
Federal Regulatory Information: N/P
State Regulatory Information: N/P

Other Information

Other Information: N/P

HMIS HAZCOM Label

Print Labels

Product ID: 110-925 TT-E-516 36118 GRAY ENAMEL
Cage: GO238 **Assigned IND:** Y
Company Name: D J SIMPSON CO INC
Street: 111 S MAPLE AVE **PO Box:** 2265
City: SOUTH SAN FRANCISCO **State:** CA **Zipcode:** 94080-6303
Country: US
Health Emergency Phone: 800-424-9300
Label Required IND: Y **Date Of Label Review:** 08/27/1993
Status Code: C **MFG Label NO:** N/R
Label Date: 08/27/1993 **Year Procured:** N/K
Origination Code: F **Chronic Hazard IND:** Y
Eye Protection IND: YES **Skin Protection IND:** YES
Signal Word: DANGER **Respiratory Protection IND:** YES
Health Hazard: Severe
Contact Hazard: Moderate
Fire Hazard: Moderate
Reactivity Hazard: Slight

Hazard And Precautions

EXPOSURE TO DUST/FUMES OF RAWMATERIALS MAY CAUSE RESPIRATORY PROBLEMS, ANETHETIC EFFECTS, RESPIRATORY TRACT IRRITATION. SKIN: IRRITATION, BURNS, ABSORPTION, DERMATITIS. EYES: IRRITATION. INGESTION: ASPIRATION OF VOMITUS INTO LUNGS CAN CAUSE FATAL CHEMICA PNEUMONITIS. CHRONIC: PERMANENT BRAIN & NEROVUS SYSTEM DAMAGE. TARGET ORGANS: SKIN, EYES, RESPIRATORY & DIGESTIVE TRACTS, BRAIN, NERVOUS SYSTEM, LUNGS. TARGET ORGANS: EYES, SKIN, RESPIRATORY SYSTEM.

instruction who is not a military or civilian employee of the United States of America should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation regardless of similarity to a corresponding Department of Defense or other government situation.

(5) Product assurance functions in support of procurement and production.

(6) Production engineering and process engineering.

(7) Support services for tenants.

(8) Custodial maintenance and administrative function of sub-installations.

(9) Support to and surveillance of Modernization and Expansion Program.

b. Specific.

Manufacture ammunition metal parts as assigned.

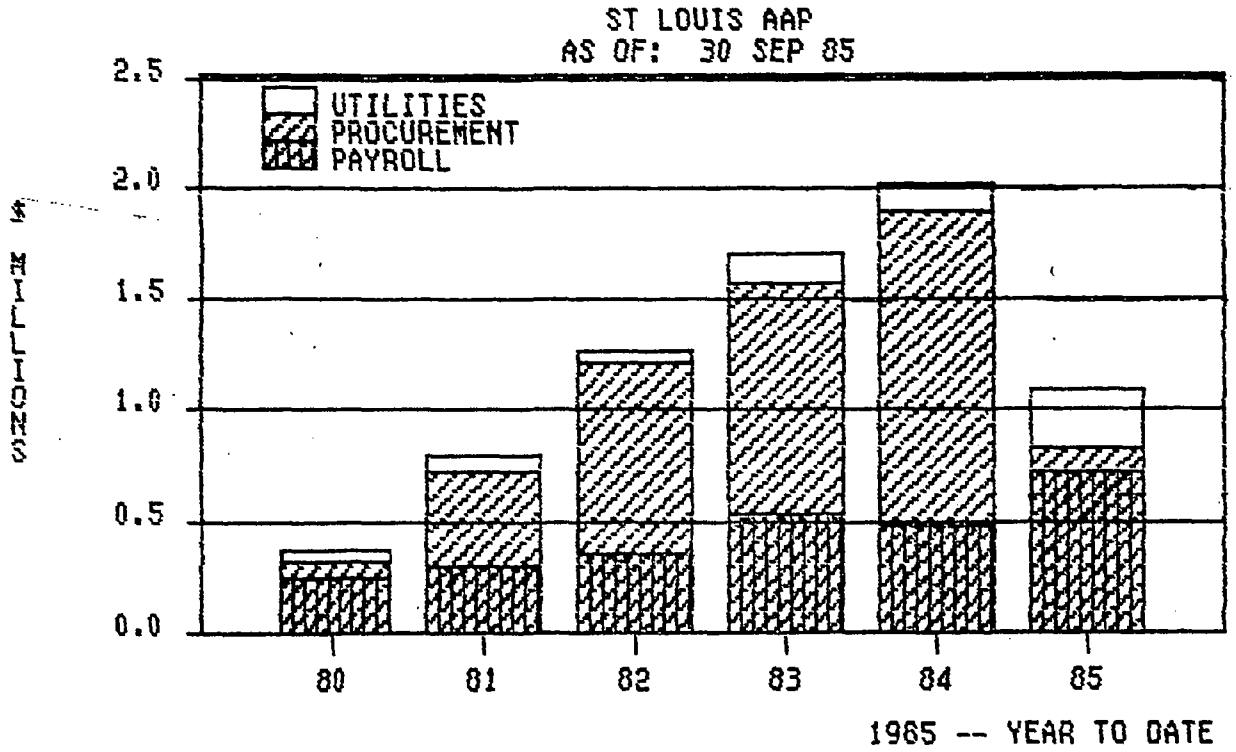
Visitors travelling to St. Louis AAP by commercial, military, or private air will land at Lambert-St. Louis Municipal Airport. Refer to the map following this article. From the terminal, drive directly onto I-70 eastbound and proceed to the Goodfellow Blvd. exit. The plant is directly to the south of the stop at the end of the ramp. However, it is necessary to turn left (north) away from the plant, cross over I-80 and continue one block to Lillian Street; turn right (east) onto Lillian and go two blocks to Riverview Boulevard (US 67); and turn right (south) onto Riverview and go under I-80. The plant entrance is on the right immediately after the underpass.

The climate of St. Louis has been described as a reasonable average of the national climate in which the extremes of cold and protracted heat are seldom experienced. The mean temperature is 56.3, with July having the highest monthly average of 79.9 and January the lowest with 32.5. Summers are generally warm; winters are brisk and stimulating. The annual average precipitation is 36.67 inches.

c. Plant Size.

Total Area	21 acres
Covered Floor Space	0.5 mil. sq. ft.
Number of Igloos/Magazines	0
Miles Roads	0.5 miles
Miles Railroads	0.5 miles
Family Housing Units	0
Replacement Value	$173.66 (Mil)

e. Dollars Contributed to Local Economy



FISCAL YEAR	80	81	82	83	84	85
UTILITIES (M$)	.055	.07	.065	0.138	0.12	0.25
PROCUREMENT (M$)	.068	0.424	0.836	1.045	1.436	0.102
PAYROLL (M$)	0.245	0.3	0.36	0.521	0.468	0.725

h. Environmental Program.

Type	No. of Sources	Permits Required	Permits On Hand	Permits Applied For
Air	0	0	0	0
Water	0	0	0	0
Solid Waste	0	0	0	0
Hazardous Waste	0	0	0	0

No known regulator threat exists.

3. SIGNIFICANT PUBLIC RELATIONS ISSUES

a. Issues Receiving Publicity.

None.

b. Distinguished Visitors.

None.

c. Congressional Delegation -- St. Louis AAP

Senators:	Thomas F. Eagleton (D) John C. Danforth (R)
Congressmen:	Robert A. Young (D) 2nd Dist. William Clay (D) 1st Dist. Richard A. Gephardt (D) 3rd Dist.

c. Corporate Background.

Donovan Companies, Inc. - The Donovan Companies began in 1918 as a local construction company installing small electrical power line systems in the upper midwest. Over the years it has grown into a multi-faceted company doing both national and international business. Currently, the company continues work in transmission and distribution lines, substation construction and heavy industrial, commercial and institutional work. Through its gas division, Donovan provides natural gas to communities in Minnesota, Iowa and Florida. It also does business in marketing propane and distributing/applying oil liquid fertilizer. It processes and sells coal to the metallurgical and steam markets in this country and abroad.

The Donovan Construction Company took over management of St. Louis AAP from the Cheverolet Motor Division of General Motors in July 1972 after it had been laid away. It is currently on contract for maintenance and surveillance of the plant.

5. FINANCIAL STATUS

Contract Overview

DAAA09-80-C-3003, Effective 01 Oct 1979

Type -- FFP

Cumulative Value -- $ 4.3 (Million)

Thru Mod 29, 28 Dec 1984

DAAA09-80-C-3000, Effective 01 Oct 1979

Type -- CPFF

Cumulative Value -- $3.40 (Million)

Thru Mod 48, 29 Sep 85